EXCAVATING ENGINEER

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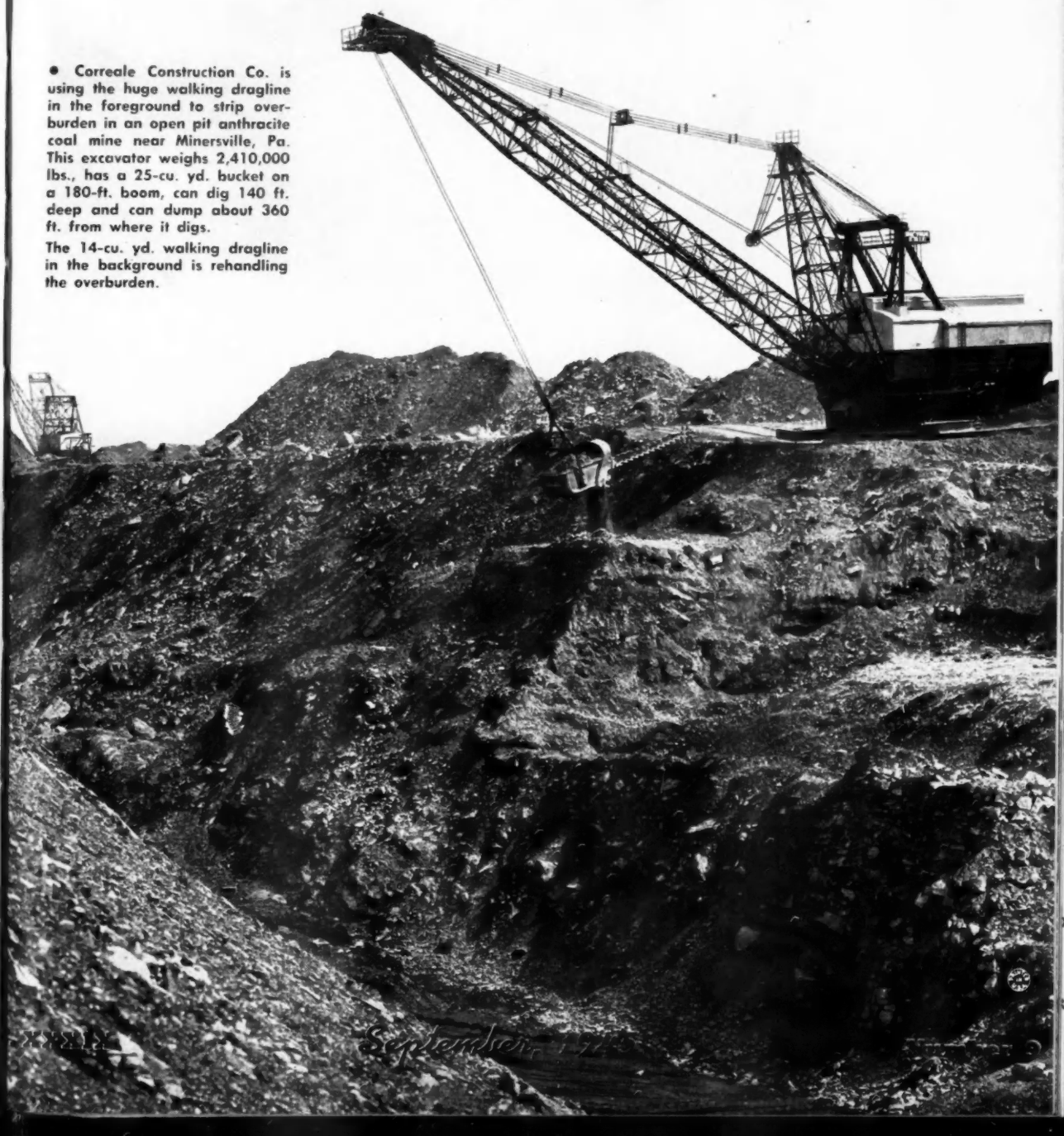

• Correale Construction Co. is using the huge walking dragline in the foreground to strip overburden in an open pit anthracite coal mine near Minersville, Pa. This excavator weighs 2,410,000 lbs., has a 25-cu. yd. bucket on a 180-ft. boom, can dig 140 ft. deep and can dump about 360 ft. from where it digs.

The 14-cu. yd. walking dragline in the background is rehandling the overburden.

September

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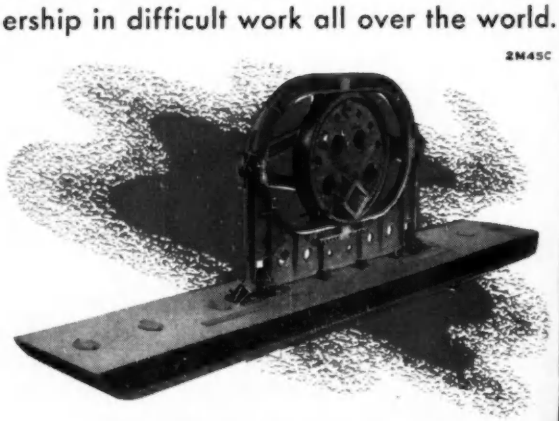

BUCYRUS-ERIE

South Milwaukee, Wisconsin

EXCAVATING ENGINEER

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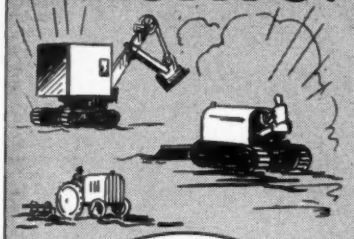
HARD FACING?



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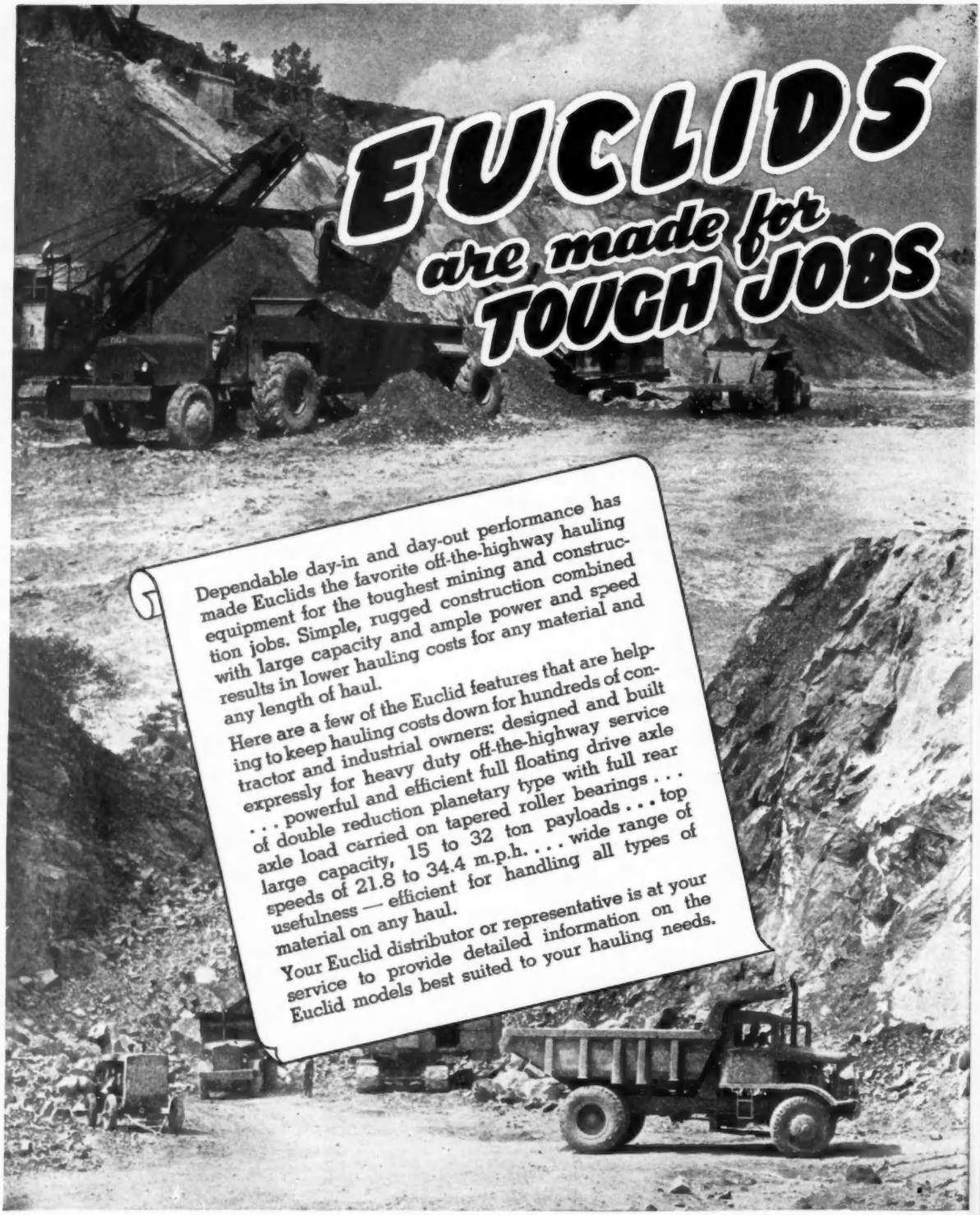

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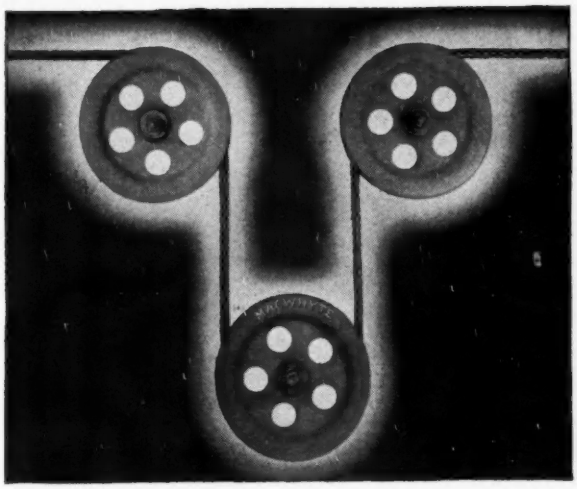

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• Pit scene at Sherwood - Templeton's Friar Tuck Mine with stripping and loading shovels, 'dozer, hauling units, and drills at work.

Casing Blast Holes

Water-bearing sand strata above rock in overburden at Sherwood-Templeton Friar Tuck Coal Mine at Linton, Indiana, causes drilling problem that is met by using casing and modifying the three Bucyrus-Erie 29-T electric churn drills used at the mine.

A WATER - BEARING sand strata that caves and runs into the holes and stops progress during blast hole drilling operations is the chief difficulty encountered by the Sherwood-Templeton Coal Company in the operation of its Friar Tuck Mine 11 miles northwest of Linton, Indiana. But, with modifications to the three churn drills used at the mine and by casing holes the Friar Tuck Mine is able to keep in steady production of an average of 40,000 tons of Indiana No. 5 vein coal monthly.

The Friar Tuck Mine was opened by the Sherwood-Templeton Coal Company in September, 1929, a year after the organization of the company. It is expected that on the present basis of production Friar Tuck will be operated for the next 15 to 20 years.

The coal mined at Friar Tuck, along with the production from the company's Robin Hood Mine, about eight miles away, is handled at one tipple and preparation plant. The Robin Hood Mine coal in the form of mine run is brought to the tipple by rail by the Milwaukee Road railroad for cleaning and sizing.

There are 22 sizes of coal shipped from the tipple, ranging from six-inch lump to ⅜ x 0. However, principal sizes shipped are six-inch lump, 6 x 4, 4 x 2, 2 x 1½, 1½ x 0. Coal from the pits is dumped from rail cars and trucks into a 200-ton hopper and conveyed into the cleaning plant on a Link-Belt flight conveyor. Coal up to four-inch is washed and 6 x 4 and six-inch lump are hand picked. After passing over vibratory screens, through crushers, over dewatering screens, heat dryers, etc., the coal is loaded to railroad cars by five loading chutes.

About 3,500 tons are handled per shift at the tipple and preparation plant and 60 to 66 carloads a shift are shipped over the Milwaukee Road and Monon railroads, with the greater part being shipped via the Milwaukee Road. Of the daily carloadings from ten to 20 cars are used by the Milwaukee Road and the balance is used for commercial purposes and is sold through the Sterling Midland Sales organization.

R. H. Sherwood of Indianapolis is president of the Sherwood-Templeton Coal Company, and B. E. Lundbled is vice president and treasurer. W. H. Stewart is vice president and operating manager and Ralph Kohr is general superintendent. R. G. Baughman is superintendent of collieries, Charles Tindall is superintendent of Friar Tuck Mine, and O. H. Lehman, tipple superintendent, and Ray Magruder,

drilling and blasting superintendent.

In order to get the coal from the Friar Tuck mine which runs in a 2.5 to 4.5-foot thick vein averaging four feet in thickness, an average of 40 feet of overburden must be removed. This overburden varies in height from 30 to 50 feet and runs on a ratio of 9.4 to 1 to coal mined. The overburden is made up of up to 20 feet of surface material consisting of top soil, clay, and sand in varying depths, up to 25 feet of shale, four and one-half feet of limestone, and from a foot to one and one-half feet of slate immediately over the coal seam.

The sand strata in the overburden varies considerably in its physical nature from blast hole to blast hole. In some instances it is very fine and in others it is more nearly a gravel. It is believed that some of the strata is water bearing.

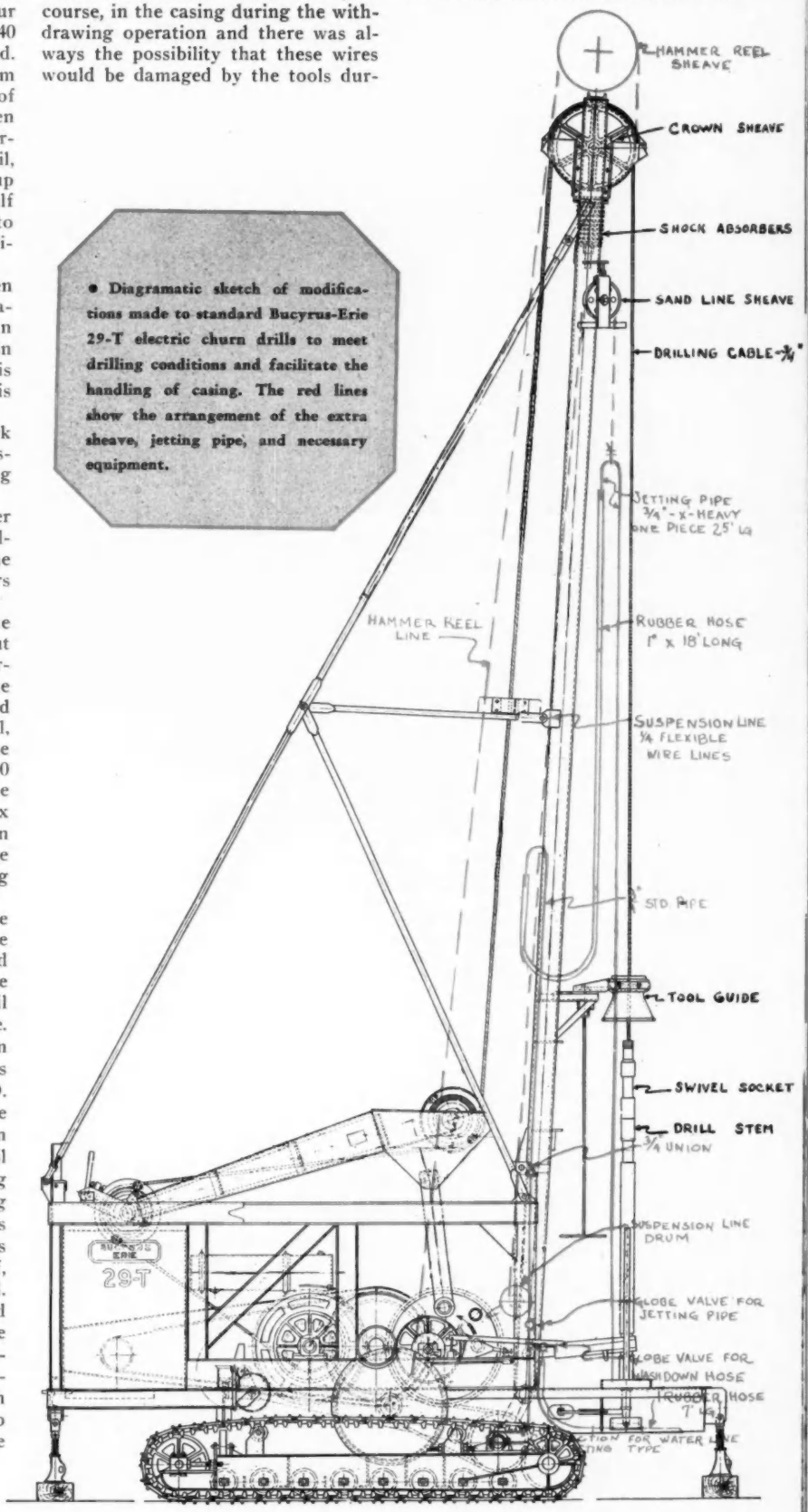
Blast hole drilling at Friar Tuck Mine is done with three Bucyrus-Erie 29-T electric churn drills using nine-inch bits.

Drilling superintendent Magruder says that due to the sand strata drilling conditions at the Friar Tuck Mine are the worst he has seen in 15 years of drilling.

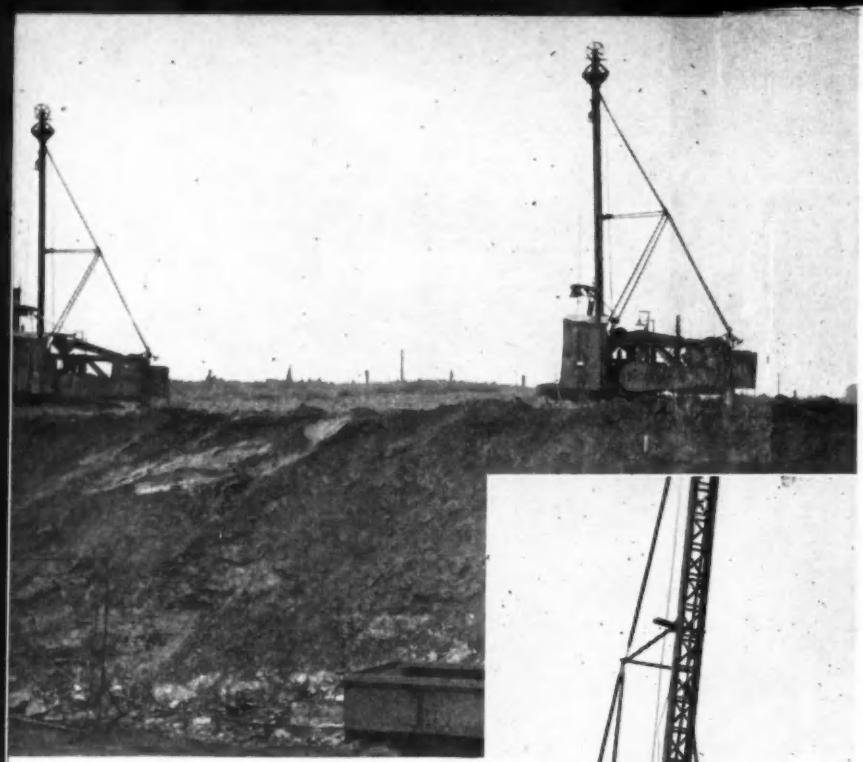
At the time the writer visited the mine drilling was being done in about 35 feet of overburden with considerable sand and water present in the overburden and the drills averaged about three holes per day per drill, but when it was not necessary to use casing each rig drilled from 110 to 115 feet per eight-hour shift. The drills work three shifts a day for six days a week and holes are spaced on 25 x 25 centers. Drilling costs average about 34c a foot. The use of casing increases cost by about one-third.

Before present modifications were made to facilitate drilling through the sandy strata the procedure followed was to drill a 9½-inch diameter hole through the clay into the sand until no further progress could be made. A 26-foot length of casing was then set in the hole with the sand line. This casing was 10¾" O.D. and 10" I.D. and had to be spudded into the hole by alternately raising the casing on the sand line and dropping it until such time as the top of the casing was low enough to permit the drilling tools to swing over it. The casing was then bumped down with the tools until the sand strata was shut off, permitting the hole to be completed.

After the hole was finished and bailed clean it was loaded with the explosive and the casing was withdrawn. Removal of the casing involved bumping the casing up with the tools until it was free, usually to a height of four to five feet. The tools were then withdrawn and the casing was lifted out with the sand line. The detonator wires were, of course, in the casing during the withdrawing operation and there was always the possibility that these wires would be damaged by the tools during the bumping operation and result in a misfire. It had been the practice for a man to climb the derrick and



• **Diagramatic sketch of modifications made to standard Bucyrus-Erie 29-T electric churn drills to meet drilling conditions and facilitate the handling of casing. The red lines show the arrangement of the extra sheave, jetting pipe, and necessary equipment.**



• **Above: Water-bearing sand strata in the overburden make difficult the job of these churn drills, two of three Bucyrus-Erie 29-T electrics used on the bank of this mine. Right: Closeup of one of the drills at work.**

hold the detonator wires in line until the casing was lifted clear of the ground after which the wires were pulled out from under the casing.

Handling the casing was improved by providing a driving head to permit more rapid driving of the casing to shut off the sand strata. Slotted holes were also added to the top of the casing to provide a means of jarring the casing out. The hazard of a man climbing the derrick to hold the detonator wires was eliminated by raising the wires with a sash cord over a sheave attached to the top of the derrick.

The sand reels on the drills were replaced with hammer reel units, a chain-driven drum with friction clutch control and a band brake. The hammer reel is operated with a lever located to the left side of the machine to facilitate handling and is particularly suitable for handling moderately heavy loads and long lengths of casing as well as bailing operations. This reel has a hoisting capacity approximately 75% greater than the standard friction sand reel and has approximately 15% lower line speed.

In addition to the hammer reel an extra sheave was also added to the top of the derrick. This sheave is in line with the drill hole and is used in place of the sand reel sheave. The line for raising or lowering the casing, which runs over this sheave, is therefore always in alignment with the drill hole.

In addition to the hammer reel to facilitate handling casing, other modifications were made on the machines to increase the efficiency of drilling. Formerly the clay strata was drilled by the flooded hole process—running a continuous stream of water into the top of the hole to carry away the mud. This process worked well for ten feet of the hole, but after this depth it was no longer effective and drilling progress was reduced. It took an hour to drill the first 20 to 25 feet of hole. This drilling time was reduced considerably by rigging up jetting pipes for lowering into the hole alongside the tools, and with a pressure of 60 pounds on the water line the mud is thinned out at the bottom of the hole.

The jetting pipe on these drills is suspended on a cable over the regular sand line sheave, and raised or lowered by a small hand-operated reel on the side of the machine. The accompanying drawing shows the arrangement of the extra sheave, jetting pipe and necessary equipment.

The possibility of damaging detonator wires by using the drilling tools to jar out the casing was eliminated by using a 500 lb. cylindrical hammer, small enough to fit inside the casing, and with a hole through the center to accommodate the detonator wires. This hammer is handled on the hammer reel line.

Water used by the drills is pumped out of a 197-foot well in an old mine into a pond by an electric pump operated by a five H.P. motor from where it is pumped a mile and a half through two-inch steel piping. A hose line connected to the pipe brings the water to the machines. About 150 feet of one and one-half-inch hose is connected to the pipeline and about 50 feet of three-fourths-inch hose brings the water to the machines. The water is used until the first length of casing is placed in the hole and thereafter there is sufficient water in the hole for drill operations. It is necessary to bail frequently, instead of about every three feet as under ordinary conditions.

Each of the three Bucyrus-Erie 29-T drills carries a 2600-lb. tool string and uses a 33-inch stroke, starting a hole with 42 strokes a minute and running the speed up to 53 strokes a minute in rock with a 38-inch stroke. The 29-T electric drill has a maximum stroke of 44 inches.

Dressing Bits

Drill bits used by the three 29-Ts are dressed in a shop at the Friar Tuck Mine. Bits are usually used for drilling from 150 to 225 feet before they need dressing. The bit dressing shop consists of a Bucyrus-Erie oil furnace with blower capable of handling four nine-inch bits, a quenching tank with four tilting racks, a rack for dull bits, a Bucyrus-Erie No. 12 bit dresser with two dies, one for dressing bits up to nine inches and the other for dressing bits up to 12 inches, and a manually operated crane for handling bits from furnace to dresser.

The Bucyrus-Erie No. 12 bit dresser is composed essentially of a horizontal ram and radial hammer, actuated at a speed of 500 blows per minute by machinery driven by an electric motor. The bits are heated in the furnace to about 1900° to 2000° F, which the operator determines by color, and placed in the bit dresser by using the crane. The horizontal ram upsets the steel by means of a die of the proper

shape and the radial hammer dresses the bit to the proper diameter and draws the steel toward the point of the bit to replace that worn away in service. All clearance and angles of the bit are provided for mechanically and adjustments can be made to provide the correct direction of the hammer blows to accomplish this.

It takes about 35 minutes to heat up the furnace to proper temperature for heating the bits and an additional 10 minutes to get the bit heated enough for the bit dresser. After the furnace has been heated it usually requires about 40 minutes to heat a bit to the proper temperature for dressing. A ring gauge is used for checking the size in dressing the bit. After being dressed the bit is laid on the floor and allowed to cool until it loses all heat color and then it is again placed in the furnace and heated to about 1500° F, taken out and quenched for tempering the steel. A magnet was used in the beginning to determine the proper heat for quenching. The bits were heated until they lost all magnetic quality. After using the magnet for a while the operator determined the proper heat by color and has been using the color method of determining his heat since.

The bit dressing shop cares for the drill bits used by the three 29-Ts by operating four hours a week. Two men handle the bit dressing operations and handle about nine bits in the half day of operation, although they have handled as many as 12 bits in this time.

Horizontal drill augers used in the Robin Hood Mine are dressed in the same shop and are built up by welding with soft metal and then faced with Stoody's hard metal.

Blasting Procedure

It was discovered that the best blasting procedure for the overburden at the Friar Tuck Mine was to allow a buffer at the toe of the high wall of not over 25 feet from the high wall, with best results being obtained with a buffer of about 20 feet.

The cased holes drilled by the three Bucyrus-Erie churn drills are loaded with DuPont's EL376A 8 x 12 explosive with 25 lbs. per foot for rock blasting, and five lbs. per foot for shale. Hercules No. 6 detonators are put in a 60% gelatine explosive charge usually 5 x 16 or 7 x 16 in size, on top of the other explosive in this hole.

After the holes are loaded and tamped with dirt and the detonators set, the casing is pulled from the holes as previously described. Not over six holes are shot at a time and from 800 to 900 lbs. of explosives are set off at each blast. About 40,000 lbs. of explosives are used per month on the average and the ratio of explosive to material blasted is two lbs. of explosive to a foot of surface of overburden. Blasting operations are carried on daily for it is not advisable to allow the EL type of explosive to stand in the holes over 12 to 14 hours. The stripping and loading shovels are shut down and hauling units are kept in the clear while blasting.

Secondary drilling is necessary occasionally, especially when the drill holes have been cased from top to bottom. One man is assigned to the secondary drilling job when it is necessary and he uses a jack-hammer for this work. A 40% gelatine dynamite is used for secondary blasting with two lbs. per hole the usual charge. Up to 22 secondary holes are shot at a time.

• A single cut system of stripping is used at the Friar Tuck Mine with shovel spoiling to the outside. The 17-cu. yd. dipper is on a 65-ft. handle and 95-ft. boom.

Stripping

A single cut system of stripping is used at the Friar Tuck Mine with the Bucyrus-Erie 750-B electric stripping shovel with a 17-cu. yd. dipper on a 65-ft. handle and 95-ft. boom spoiling to the outside. The stripping shovel leaves a 40-ft. berm of coal which is loaded out by a Bucyrus-Erie 75-B 5-cu. yd. loading shovel.

The stripper moves an average of 325,000 cu. yds. of overburden a month, but has moved up to 420,000 cu. yds. a month. It works three eight-hour shifts a day seven days a week and operations continue during the winter months.

There are two operators on both the stripping and loading shovels and these men change duties of operating and oiling each hour. This stagger system of operating the shovels has been found very efficient at the Friar Tuck Mine for it results in better yardage and tonnage by the shovels and more careful maintenance of the machines. This increased yardage because of less job fatigue and better maintenance as a result of greater interest in efficient operation of the machines more than pays for the additional labor cost required under this system.

The stripping shovel is given a maintenance inspection every two hours and each shift the roller rack

• The Bucyrus-Erie 5-cu. yd. loading shovel is taking the coal out of this end cut. The LaPlant-Choate bulldozer cleans the coal seam.

• From 60 to 65 carloads a shift are loaded from this tipple and preparation plant at Friar Tuck. The plant also handles coal from the Robin Hood pit. Smoke is from nearby burning gob heap.

is greased as the operator makes three complete swings with the shovel so as to change position of the dollies. Dipper teeth are changed every six days to two weeks, depending upon the type of material being stripped. Dipper teeth are fitted with Finkl tips and worn teeth are built up by welding with manganese rod.

Roebling wire rope is used on the stripping shovel and the 1¼-inch hoist ropes are lubricated daily with Shell V-278 (black oil).

A Caterpillar RD-7 tractor with LaPlant-Choate blade and an International ID 6 with a Baker blade are used for cleaning up in the pit. The Caterpillar with LaPlant-Choate bulldozer is used to clean up around the stripping shovel and the International with Baker bulldozer is used to clean the coal vein before loading operations. Both bulldozers are also used for haul road maintenance.

Loading Coal

The Bucyrus-Erie 75-B 5-cu. yd. electric loading shovel works one eight-hour shift a day and loads an average of 40,000 tons of coal a month, but has loaded as much as 60,000 tons a month when loading nearer the tipple. The coal vein is of a rolling nature with the vein running in grades from 2% to 7%. Coal is not blasted before loading.

There are 38 men employed in the pit including seven operator-oilers on the stripping shovel, four ground men for the stripping shovel, two operator-oilers on the loading shovel, seven pit laborers for three shifts, 16 drillers and helpers for three shifts, and six truck drivers.

Two Euclid diesel trucks with 33-cu. yd. trailer units and four gasoline-powered Darts with 30-ton United Iron Works trailers haul the coal from the loading shovel to the tipple. When possible, trucks are loaded on a circular hauling system from coal loader to tipple. When working in end cuts the hauling units, of course, must make U-turns on the pit road to get back to the tipple. The Euclids use about 30 gallons of fuel oil an eight-hour shift and the Darts use about 50 gallons of gasoline a shift with an average round trip haul of four miles and making from 15 to 23 trips a day depending upon the length of haul. When the haul is long and the roads are in bad condition the hauling units use more fuel. The minimum haul to the tipple is one and one-half miles.

Goodyear tires are used on all hauling units and it is found that the average life span of the tires is from 20,000 to 25,000 miles. Truck greasing operations are carried on at the 60 x 113, eight-stall company garage on the property every night with each unit getting greased about every other night. Steady maintenance has kept the hauling units in good condition and although they have all been operating over a year none of them have required overhauling to date. The garage is steam heated and the warm air is circulated by American Blower fans in the winter. In the summer cold water is circulated through the heating system and the fans are used for air conditioning.

Standard gasoline and Shell lubricating and diesel oil are used for the hauling units. The tires are checked every night and pressure is maintained at 60 lbs. Lubricating oil is changed at least every 72 working hours and when the oil is changed the oil filters are discarded. Gasoline and fuel oil are hauled to the mine by tank trucks and stored on the property in a 1,000-gallon fuel oil tank and a 2,000-gallon gasoline tank.

Four men work in the garage, one on the day shift and three on the night shift. The garage carries a very complete line of parts for the hauling units.

Maintaining Haul Roads

Haul roads are 60 feet wide outside of the pit and 40 feet wide in the pit. Hauling units run on the coal seam in the pit and haul roads outside of the pit are surfaced with 12 inches of shale topped with three or four inches of gravel. The haul roads are maintained with a road drag and grader which work practically every day, and the roads are sprinkled with water constantly during hauling hours. The average grade of the roads is 3½% and there are five miles of haul roads on the property.

Drainage becomes a problem at times at this mine and seven electric American centrifugal pumps, including two 6-inch, one 5-inch, one 3-inch, and three 2-inch, are used in the pit. Surface ditches drain away water from the pit and also take care of some of the ground water on the property.

The company maintains its own shop on the property which is equipped with a gear press that can handle gears up to 150 tons in weight, six feet in diameter and 15 feet long. Other equipment in the shop includes a five-ton overhead crane, four lathes, three electric welding machines, one gas welder, one combination gas and electric welder, a power hack saw, post drill, radial drill, core grinder, and bench grinder. Nineteen men are employed regularly in the shop and each works 49.5 hours per week.

(Continued on page 524)

• Nineteen men are employed in this company shop equipped with presses, lathes, drills, grinder, cranes and welding equipment. Dinkey engine is one of two used to haul gob cars.

• This Dozer-shovel's low clearance of 7'5" simplified the job of excavating this basement and garage. It is shown emerging after a final cleanup of the inside excavation.

Digging a Garage

Verdev Trucking Company of Milwaukee uses Dozer-shovel to excavate basement garage without disturbing occupants of house.

THE EXCAVATION OF A garage beneath a house and a driveway connecting it to a passing highway provided the Verdev Trucking Company with one of its most unusual excavating experiences in its ten years in the excavating business.

The job, in the Town of Lake, a suburban Milwaukee community, consisted of digging out a basement, part of which will serve as a garage for the owner, under the house, cutting a drive 12-ft. wide and 70 ft. long from the level of the basement to the highway, terracing the area on both sides of this drive, and filling in an old driveway. The job involved the digging and moving of 170 cu. yds. of dirt and was completed in 16 hours without disturbing the occupants of the house.

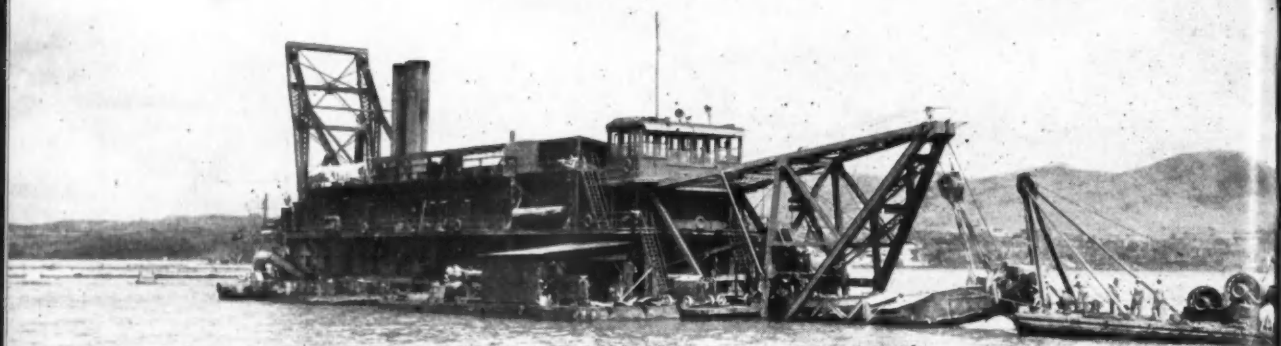
The rear half of the basement of

(Continued on page 524)

• During final cleanup work the machine dumped its loads alongside of the driveway.

• Trimming the driveway cut with the sides of the bucket in lowered position.

1912 - Harbor Stretcher - 1945



• The Dredge YM-18, the former "Indiana", purchased by the Navy in July, 1943, working in Portapra's inner harbor at Guam.

Former Great Lakes Dredge & Dock Co. dredge, "Indiana," now working for U. S. Navy as the YM-18 to build up acreage and improve harbor of our Pacific Island base of Guam.

SOMEDAY Orient-bound travelers will again fly the vast loneliness of the Pacific in the China Clipper. Business or pleasure bent, they may stop at Waikiki, sip cocktails in the scaviola fringed hotel at Midway, and swim in the incredibly blue water off Peale Island at Wake.

And when they get to Guam, they will more than likely be dumbfounded at the sight of Port Apra tucked away under the Clipper's wing, for it will seem unreal, different from the way these veteran travelers remembered it from 1941. It well may be, for in their absence a group of Seabees with dredges, including the venerable "Indiana" under a new name, are quietly changing the face of the earth so much around Port Apra that it will never again look the same from the air.

Acres and acres of new land — to say how many would be a violation of security — have been built up with coral dredged from the harbor floor. A new bulkhead line, faced with steel, now zigzags where sleepy coconut palms waved. When Admiral Nimitz recently predicted, "If these islands aren't large enough, the Seabees will make them bigger," it was only because he probably had taken his cue from past performance.

There are other dredges working at Port Apra in addition to the Indiana, but this is her story because so much of the Guam yardage belongs to her. The way things now add up, about one-third of the acreage to be built will have run through her pipeline when the final reports are written.

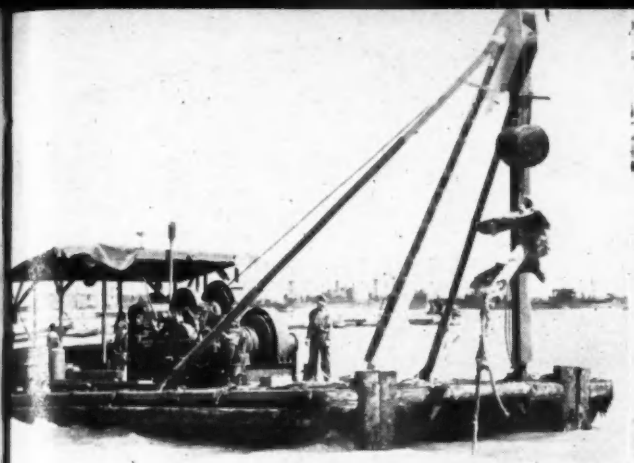
The Indiana machinery was built by Bucyrus-Erie Co. for the Port of Portland in 1912. The files of west coast army engineer division offices show millions of yards of dirt pumped by this machine. In the early thirties she was purchased at Oakland, California by Great Lakes Dredge and Dock Company of Chicago, who had more work on the Great Lakes than they could do with available dredges.

The $110,000 towing bill required in bringing her through the Panama Canal, around Florida, up the east coast and down the Saint Lawrence Waterway to Lake Michigan is still famous in the Great Lakes office, for in those days that was no little sum of money and no little sea mileage. Since then she has taken longer trips, and worked on more expensive jobs.

She dredged two rush jobs on Lake Michigan and was towed to Manitowoc, Wisconsin, to be rebuilt. Bucyrus-Erie contracted to redesign the dredge and provide the required new machinery. The Manitowoc Shipbuilding & Drydock Co. did the reconstruction work as a subcontractor. The only parts to be salvaged and used were her 206' x 44' x 12' steel hull, and her forward gantry.

Twin Babcock and Wilcox 2500 horsepower water tube, oil burning boilers were installed. Bucyrus-Erie built and installed her 30-inch pump, deck pipe with stands, a special watertight stern swivel connection permitting 270 degrees of turn with pipeline anchored, her suction intake, ladder, cutter shaft, cutter head with spares, and a port swing cable fairlead mounted on deck forward. Her 65-foot, 34-inch diameter, 17-ton round spuds were supplied by Youngstown

By R. P. DAY, CCM, USNR



• Left: This anchor scow moves a pipeline anchor for Dredge YM-18. • Right: The "Kapalama" services the dredge.

Steel and Supply Co. When she had been refitted with auxiliaries to be described later, she went to Sandusky, Ohio, to pump a job for the army.

During this time the Indiana performed under a man who helped to train many of the Seabees who now form her crew. His name was "Captain Nick" Paulin, and Great Lakes places him among its top dredge captains. Short, bull-necked, rough-spoken and as kind as he was competent, Captain Nick rode the Indiana through the Gulf of Mexico in water so rough some of it shipped down the Indiana's stacks. At Cameron, Louisiana, the Indiana pumped her all-time record of 93,000 cu. yds. of silty sand in a 24-hour run.

In 1941 the U. S. Navy began developing Caribbean bases. Still under Captain Nick, the Indiana slogged down past Guantanamo, St. Thomas, and tied up at Port of Spain, Trinidad. Her refrigerator was cleaned out; not even a pound of the bloody fresh beef Captain Nick and the cook bought in Guantanamo remained. Her sides were roughed and broken by the sea. Her pipe, anchors, and spares were red with rust. But exactly 28 days later, coral was flooding out of her pipeline. Under no compulsion stronger than a rental contract and Captain Nick's conscience, the Indiana produced at high capacity despite hard coral, German submarine attacks within a mile of where she worked, and a shortage of skilled labor. She dug 12,500,000 cu. yds. and on July 1, 1943, the Navy purchased her outright with all her auxiliaries including the tug "George H. Jackson" of New Orleans.

The Indiana was renamed the YM-18. Her light gray paint was changed to the deep, dark color of the Pacific; for it was in the Pacific that her destiny lay. She left Trinidad in June, 1944, protected from the sea by 3" x 8" timbers on her sides, and plodded 5,000 weary miles toward Hawaii. God and His elements were kind, for a month later the little band of Seabees who manned her arrived off Diamond Head without encountering anything more dangerous than moderate seas.

When she lowered her cutter down on the inner harbor floor at Guam in November, 1944, the need for her dredging was acute. Never in history had Port Apra's inner harbor taken a big ship, and berthing facilities were urgently needed. Inside the barrier reef at the entrance to the inner harbor, a few 30-foot channels meandered, but for the most part this area was not navigable.

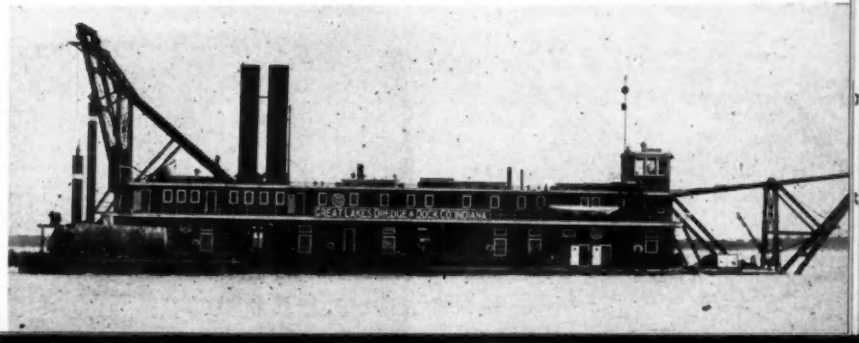
The YM-18's pipeline was strung out in back of historical old Spanish Fort Santa Cruz, in the clear of another dredge which had already cleaned out part of this reef before the YM-18 arrived.

Using a six-blade Birdsborough cutter with scalloped blades, she immediately ran into serious trouble. The cutter was right, but the cutter turbine failed. It was replaced by two GM diesel engines, which worked three weeks until the cutter turbine off the Dredge "McMullen" was installed. The turbine was warmed up slowly, and Seabees held cutter rpm down under 10 for several days. After a week, they started opening up the valves carrying 175 pounds per square inch, and the YM-18 began to show some of the signs that made her famous at Cameron and Trinidad. 20,000 cu. yds., 30,000; on up until her crew under Bos'n T. W. Mackie coaxed 53,000 cu. yds. through her pump in a 20-hour run. Coral, pouring out in a stream across a reef where a 15-foot fill was being laid at the time, built up so fast that the dump crews were hard pressed to keep pipe ahead on a multi-legged line. Two, three and four legs were used on shore pipelines.

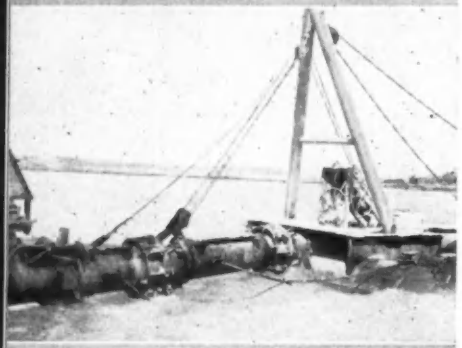
The YM-18 was digging at this time on a 5,500-foot line, lifting coral 14 feet above mean low tide, and she had already run into a troublesome problem of pump liner wear. Digging with an average 18-inch vacuum, with 4,500 h.p. on her main pump turbine, under a pipeline pressure of between 105 and 120 pounds per square inch, the heavy, slimy coral mud (3400 pounds per cu. yd.) began to eat her pump liners so badly that some of them completely disappeared in 90,000 yards. In normal digging, where up to 50% sand is found, three million cu. yds. could be pumped by the Indiana before the liners needed replacement.

Inspections early in the job showed

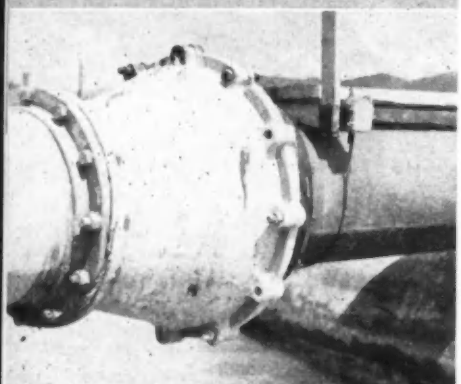
• This is the YM-18 back in 1935 when, as the "Indiana" she was working for the Great Lakes Dredge and Dock Company of Chicago who had purchased her in Oakland, Calif., and towed her through the Panama Canal, up the Atlantic coast and down the St. Lawrence Waterway to Lake Michigan.



• Chain and wedge joint used on shore pipe. Longitudinal cable holds thrust pressure on pipe.



• Stern swivel and pipe connections of Dredge YM-18.



• Above: Fort Peck type joint. Below: Great Lakes type joint.

the segment plates near the discharge throat of the 10-foot diameter Bucyrus-Erie pump, where coral and water boil through under terrific turbulence and high pressure, to be affected most. The YM-18 was shut down and the first experimental work was begun to build up service life of pump liners in Guam coral.

Using Stoody 3/16" rod, Seabee welders added metal to the segment plate faces inside the pump, working in tropical heat made more intense by steam. One segment plate faced with Stoody showed no appreciable wear in the next 250,000 cu. yds., while another faced with Stoodite showed chipping and bad cavitation. Out of these experiments with a hard facing technique not especially new, the Seabees solved the problem well enough to say, as this is being written, that continuous production up to a million cu. yds. without having to shut down for pump repairs now is possible.

Segment plates, shell liners, ring and intake liners are being hard faced before they go into the pump. Welding is much more comfortable and efficient when the Seabees can work outside on the welding scow, doing flat welding on the pieces.

Stoody rod was used until the supply ran out, and HCN "Stainweld" was then brought in, which works equally well. Six hundred pounds of rod required for one hard facing job, takes about 20 man-hours to apply. As this is being written, a half million cu. yds. have not damaged the first completely faced liners, and it appears as if consecutive 45,000-50,000 cu. yd. days are no longer a cause for concern.

Pumping at Guam, other than the abrasive quality of the material, is about as average a condition as the YM-18 has tackled since she left Louisiana. She has been spotted in the softest, heaviest coral — and there is some coral rock and finger coral in the harbor — which requires the longest pipeline to move muck on the fill.

Plummer, Great Lakes and Fort Peck type pipe joints are used on her floating line. Some of her pontoons were dented when she arrived in Guam; much of her floating pipeline was considered to be worn out. But by patching and turning some of the sections 180 degrees, the Seabees kept this pipeline in service until new pontoons and pipelines could be shipped. Nearly 2,000,000 cu. yds. will have passed through these "worn-out" lines when the new ones are ready.

The YM-18 uses Great Lakes-type elbow sections on its floating pipeline. Carrying solution through an S-shaped section, the elbows permit the line to be anchored, and still permitting a wide range of turning radius. Line pressure tests run by R. H. Davenport of Great Lakes Dredge and Dock Company showed the same friction and pressure values as 120 feet of open pipeline, and since only two such sections are normally used this is considered negligible. Wear is concentrated somewhat, and the elbows have to be relined after handling 2,000,000 cu. yds. of Guam coral.

Under ordinary pumping conditions, the line is subject to a 100 psi pressure, though 120 psi has been reached on 6000 feet of line with a high lift of 16 feet. On two occasions seams split open on a few of the more badly worn shore pipes.

Pumping Problems

According to her operators and Bos'n Mackie, who is one of Captain Nick's proteges from Great Lakes Dredge & Dock Company, the YM-18 finds the pumping of soft coral ooze difficult. Certain sections of Port Apra's inner harbor contain fine, slippery ooze resembling blue gumbo in the lower Mississippi River basin of the USA. If the dredge is stopped for any reason with its line loaded with this material, it settles in the bottom of the 30-inch line. Then, when the pump is again started up, this settled slime, instead of working itself into the solution, will roll up in a caked mess and plug the line. Once 1600 linear feet of pipe were plugged in 15 seconds, and the floating line had to be parted in six places and cleared by pump pressure.

So treacherous is this same material on the dump ground that tractors have to be kept away from the front of the line. The dump is being handled by running from two to four legs off "Y" sections and pumping one line while additional sections are placed on another.

The YM-18 generates 325 pounds per square inch of steam in her boilers. Steam for the pump turbine enters at this pressure. Steam on the cutter turbine varies from 50 to 175 pounds per square inch, and all her auxiliary steam lines carry 175 pounds. The gear reduction ratio between the Elliott turbine and her 30-inch Bucyrus-Erie pump is 9.6:1; from 3600 to 375 rpm.

Seabees who operate the YM-18 have to man and care for 14 steam turbines ranging from six to 5000 h.p.; 12 duplex pumps from 3" to 7"; a Sperry gyrocompass; a refrigerator system; two 6000-gallon per day Paracoil evaporators; three light plants (60, 50 and 5 kilowatt); and complete water and sewage disposal facilities. The Sperry gyrocompass eliminates the use of unsatisfactory dredging

buoys which formerly marked the sides of the cut. When the cut is laid out on a harbor map the dredge is spotted in position on the center-line and the gyro is adjusted. It is then simple to calculate the exact port and starboard degree reading of the gyro-compass to bring the cutter-head out to the sides of the cut.

Dealing with only two center-line points this system saves labor and simplifies cutting operations and has squared cuts until they can be dug almost as accurately as a draftsman can draw them. Daily advances are read off the stern of the dredge by sextant and plotted on the map with a protractor.

In order to keep her boiler feed water recovery 85% efficient, her engineers must keep 1600 ¾"-tubes in her main condenser tight, and check everything for steam leaks. Her secondary condenser has 500 tubes the same size. Routine tests are made daily of boiler feed water, testing for hardness and salt content. The chemical reaction between lime and brass tubes which caused tubes to loosen and eat through at Trinidad has not been present at Guam.

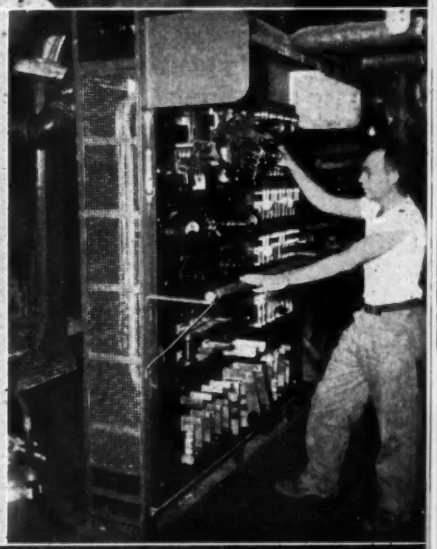
Seabees have been quite busy doing preventive maintenance and making major overhauls to her smaller turbines, cutter gear box, all pumps, swing engines, spud engines and electric blowers. Her service condensers were retubed. The drill press and lathe was repaired and put to use 24 hours a day making spare parts not in stock and hard to get. Her hull inside was painted white, replacing the dark colored paint which made a 100-watt light look like "a June bug in a pop bottle," according to Carpenter Harmon, her chief engineer.

The YM-18 uses between 350 and 450 barrels of Bunker C heavy fuel daily; she operates effectively, pumping 68% of the time; and is now digging about 22,500 cu. yds. per day every day. This figure is constantly rising due to the fact that the Seabees are coaxing consecutive 50,000 cu. yd. days out of her.

These results were not easy to obtain. There was a time when the crew was not as well trained as it is now, and not interested one way or another whether she dug. Careful training, official dissemination of job information, and the rewarding of personal initiative with a "thank you" have helped to correct this difficulty.

Hanging on the bulletin board are the latest yardage figures. Each man knows his efforts are appreciated, because Bos'n Mackie has told them so over his signature. Christmas Day each man, with his dinner, got a per-

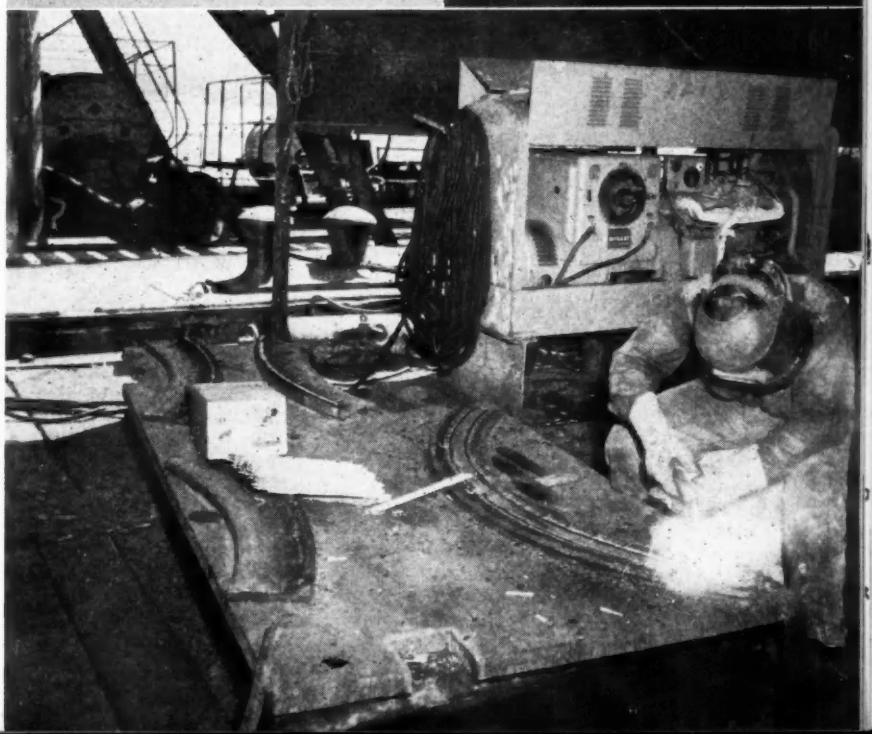
(Continued on page 524)



• **Above: First course—soup. Crew's mess on Navy's Dredge YM-18.**

• **Right: This new switchboard was installed on the dredge by the Seabees.**

• **Below: Seabee welders refaced segment plates in the field.**

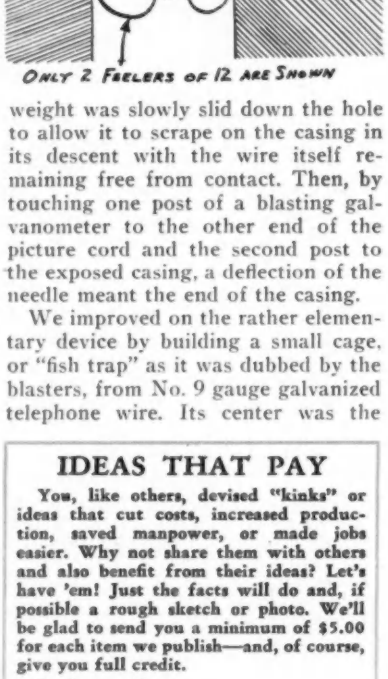


Field NOTES

Determining Casing Lengths

While engaged in drilling blast holes in a large western Wisconsin trap-rock quarry we used old oil well casing in the upper extremity of holes that threatened to cave. While in most cases the length of these casings were recorded and the information passed on to the head blaster, there were instances when the information was not available and a means had to be devised to measure the casing to determine proper loading values.

Our first experiment was a window sashweight fastened to some 25 feet of ordinary picture wire. The sash-



ONLY 2 FEELERS OF 12 ARE SHOWN

weight was slowly slid down the hole to allow it to scrape on the casing in its descent with the wire itself remaining free from contact. Then, by touching one post of a blasting galvanometer to the other end of the picture cord and the second post to the exposed casing, a deflection of the needle meant the end of the casing.

We improved on the rather elementary device by building a small cage, or "fish trap" as it was dubbed by the blasters, from No. 9 gauge galvanized telephone wire. Its center was the sashweight to provide pushing power on the downward travel. The 12 feelers of telephone wire were attached to the weight and made positive contact with the casing all the way down in spite of deep rust pitting or dents. One or several of the cage's feelers always were in contact with the casing for continuous galvanometer readings.

By Myron Carl

"Fish-plating" Dredge Hose

Remembering a lesson learned in the critical rubber days of late 1941, Seabee officers of a Construction Battalion built up the effective wearing life of the 34-inch flexible rubber suction intake on the dredge YM-20 by an estimated 500%. The result has been accomplished by "fish-plating" the bottom third of the rubber intake with high carbon steel plates cut from a pipeline section.

The flexible section is 15 feet long. It connects the stationary suction leading from the cutter to the stationary section feeding the pump, and takes all the up-and-down play as the ladder is raised or lowered to variable depths. The idea of reinforcing the rubber tube to prevent excessive wear was first originated by Standard Dredging Company in Hawaii in 1941, when Captains Albert Randall and Hermann Rossebo (now Lieut. Comdr. Rossebo, captain of the YM-20) plated the suction intake of the 27-inch dredge "Jefferson".

High carbon steel plates were cut from pipelines and shaped to fit the rubber section. Nine pieces were used, measuring 18 inches in length and 37 inches along the arc. A new flexible hose was reinforced, to be installed as soon as the YM-20 shut down for routine repairs and pump relining.

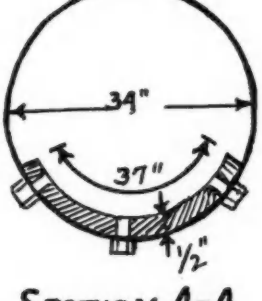
The sections were fastened by three ¾-inch bolts, with heads countersunk flush with the steel. The holes were drilled ⅞-inch in diameter, using an air drill. These holes were centered between the spring steel reinforcing rings by locating them with a probe, or by tapping with a hammer. Some of the holes required one hour to drill and dulled two bits. Others went through easier, but never in less than 10 minutes.

Steel sections were laid in a shingle pattern, so that the pressure of incoming material would force the laps down on the bolted end. The No. 9 section ended up on the metal of the flanged stationary nipple section, and was securely welded, using stainless steel hard-surfacing rod to build up the fillet.

The piece that was removed carried approximately a million cubic yards of western Pacific coral without benefit of fish plating, but the coral was so abrasive that all the rubber was worn through on the bottom quarter of the tube, and about ⅜-inch of the steel spring rings were exposed. According to Comdr. Rossebo, the life of this particularly expensive piece of rubber can be prolonged to the point of deterioration by inspecting the fish plates periodically and renewing them when necessary. He believes that the wearing life will be increased from a million to five or six million cu. yds., on the basis of previous experience with abrasive Pacific coral.

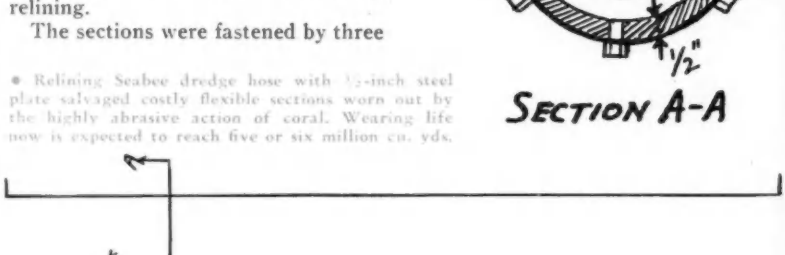
The total field cost of labor and materials for the job was approximately $100, while a new flexible section costs $2000.

By R. P. Day, CCM, USNR



SECTION A-A

• Relining Seabee dredge hose with ½-inch steel plate salvaged costly flexible sections worn out by the highly abrasive action of coral. Wearing life now is expected to reach five or six million cu. yds.



FLEXIBLE RUBBER SUCTION RELINING

IDEAS THAT PAY

You, like others, devised "kinks" or ideas that cut costs, increased production, saved manpower, or made jobs easier. Why not share them with others and also benefit from their ideas? Let's have 'em! Just the facts will do and, if possible a rough sketch or photo. We'll be glad to send you a minimum of $5.00 for each item we publish—and, of course, give you full credit.

Send your idea to:

Field Notes Editor
EXCAVATING ENGINEER
South Milwaukee, Wis.

"Caterpillar" Diesel D8 Tractors pull scrapers on medium hauls in building the mountain-top Kanawha Airport

NEAR Charleston, West Virginia, heart of the Kanawha chemical and industrial empire, a remarkable airport is being built. There's no level ground in the region — nothing but rough sandstone hills and narrow, steep-sided valleys. But by slicing the tops off four adjacent mountains, and filling the valleys between, they're building a huge, modern airport with runways 6000 feet long!

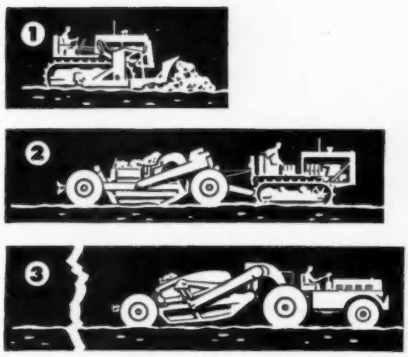
Today some 60 "Caterpillar" Diesel Tractors—track-type and wheel—are busy moving these mountains. Husky D8's are slashing through earth and rock with their bulldozers and tumbling the hilltops into fills as deep as 230 feet.

On the medium hauls, the same sturdy track-type tractors are pulling 25-yard scrapers to the fill. And on the longer hauls of half a mile or more, where road-speed is important, "Caterpillar" Diesel DW10 Tractors, rolling on rubber, take the earth away in "Caterpillar" W10 Wagons. The whole mountain-moving operation is a graphic example of *zoned equipment*, effectively used on a contract totaling over 5,000,000 yards.

Also on this job, three "Caterpillar" Diesel Motor Graders are constructing haul roads and runways; and nine "Caterpillar" Diesel D13000 Engines are powering shovels and compressors.

The Harrison Construction Co., contractors on the airport, have had a great deal of experience with "Caterpillar" Diesels, moving more than 32,000,000 yards of earth in the past four years. Says L. S. Wescott, Asst. Chief Engineer: "On our jobs, temperatures have ranged from 110° in the shade to 40° below zero. Mud has been knee-deep and dust almost as thick. Completely equipped repair shops have been non-existent, and, in spite of these conditions, field-repaired 'Caterpillar' equipment has stayed on the job, working night and day."

CATERPILLAR TRACTOR CO., PEORIA, ILL.



Zone Your Equipment for Lowest Costs on Earth

1 *Track-type tractors, with bulldozers and rippers.*

2 *Track-type tractors for loading and pulling scrapers.*

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Shots from the FIRING LINE

Skelly Says Diversion is Highway's Menace

American highways have been deprived of more than $2,000,000,000 in the past few years through tax diversion, James J. Skelly, president of the American Road Builders' Association, pointed out in a recent highway conference.

The Media, Pa., contractor praised the federal-aid airport bills now before Congress for provisions which prohibit the practice. He cited the McCarran Bill (S-2) favorably reported by the Senate's Commerce Committee which provides that federal funds for airports will be withheld from those states that divert any taxes on aviation fuel or other special fees on aircraft, aviation or aeronautical facilities or operations.

"Our organization is much interested in airports and airport legislation because of our Airport Division, and because the same methods, equipment and materials are used in both forms of construction," said Skelly. He added that the association had been called upon for expert testimony at the hearings on the pending airport bills.

"The present federal-aid highway law, while declaring that it is unfair and unjust to tax motor vehicle transportation unless the proceeds are applied to the construction, improvement or maintenance of highways, may deprive the state of only up to one-third of its federal aid for such diversion," Skelly pointed out. "In consequence, all but 15 of the states divert all or part of their highway user taxes to general funds, education, relief or other purposes.

"Sixteen states have passed anti-diversion amendments to their state constitutions—California, Colorado, Idaho, Iowa, Kansas, Maine, Michigan, Minnesota, Missouri, Nevada, New Hampshire, North Dakota, Oregon, South Dakota, Washington and West Virginia," the Road Builders' president stated.

Amendments will be voted upon in Pennsylvania this fall and in Maryland and Texas at the general election in 1946. Voters of Indiana and Tennessee will consider the question in 1947, but the bill must also be passed by the legislature of that year. At the last session of the Illinois legislature, a resolution in opposition to diversion was passed.

"Oregon in 1919 was the first state to tax gasoline for highway purposes and others rapidly adopted this means of raising revenue," said Skelly. "In 1925, we find the first record of using this tax for something else. Up to 1932, raiding the gas tax was nominal, but in the past 12 years, the states have been dipping in more and more until the staggering total of more than two billion dollars was reached. Our post-war highways are going to need every cent that is available."

Figures for 1943 show $155,455,000 diverted from a net total receipt of $1,108,849,000 which came from motor fuel taxes, motor vehicle fees and fines, motor carrier taxes and the like, Skelly explained. Among the states making the greatest diversions were New York, California, Florida, Ohio, Pennsylvania, Texas, Georgia and Illinois.

"I regret that my own state of Pennsylvania is well up on the list of offenders, but that will be changed when the constitutional amendment goes to the voters in November," he said.

• The shores of Iwo Jima resembled a vast depot as military supplies and equipment poured inland. Vital cargoes of diesel fuel were ferried to the beaches by LST's for transfer to trucks. The Bucyrus-Erie Bullgrader 'dozed a ramp to the doors of an LST so trucks could load out the oil drums.
PAW Photo by Corsini

Restore Practice of Public Bid Openings for Contracts

Lieut. Gen. E. Reybold, Chief of Engineers, has advised the Mississippi Valley Flood Control Branch of Associated General Contractors of America that after further consideration he has modified the procedure in the awarding of construction contracts. Bids for flood control and river-harbor work will be opened publicly, as is desired by the construction industry. After the bids have been opened publicly, the contracting officer will begin to negotiate contracts beginning with the lowest bidders.

Bid openings are now restored substantially to the same basis as was in effect prior to the institution of private opening of bids recently.

General Reybold's letter is as follows:

"This is to supplement and modify my letter to you of 10 July 1945 with respect to the procedure in the awarding of construction contracts.

"Further consideration has been given to the method of awarding con-

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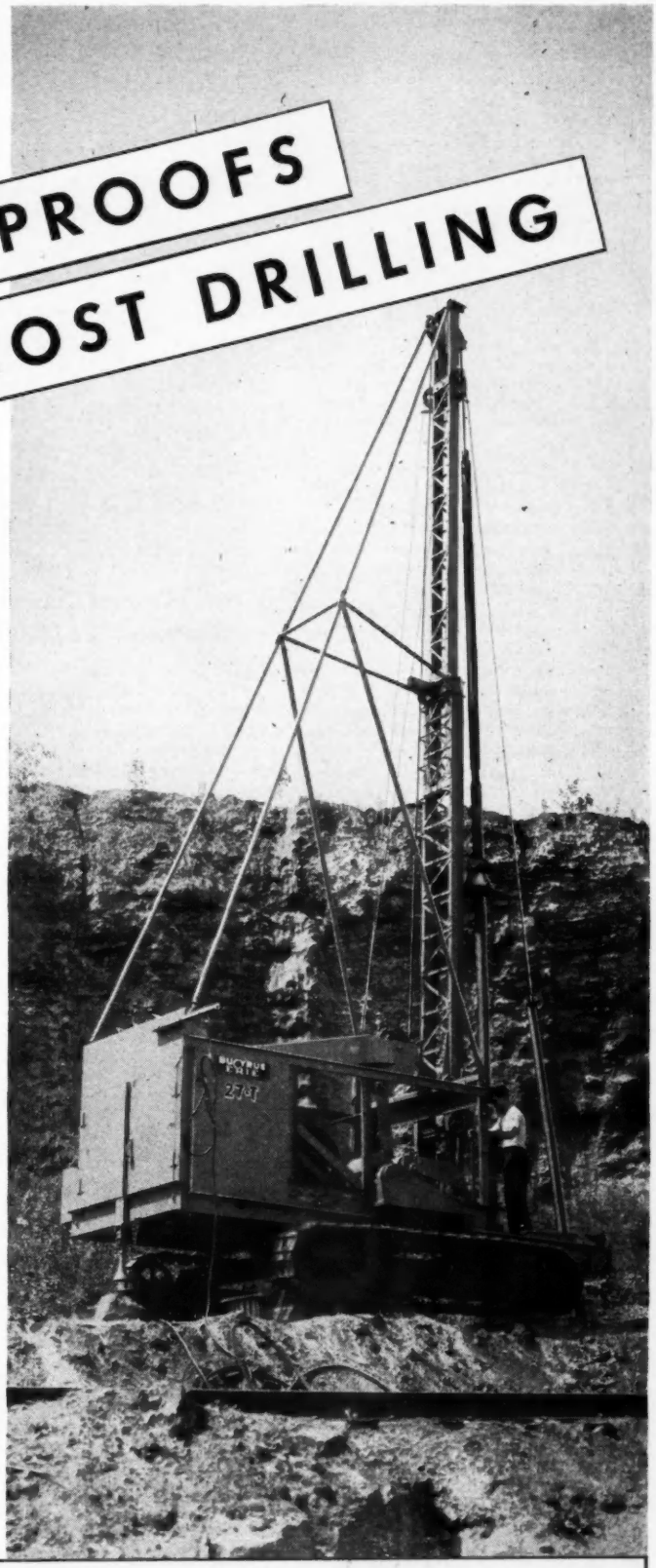

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• Bucyrus - Erie 27 - T electric churn drill and Marion shovel working in Bingham Pit of Cleveland Cliffs Iron Co. at Taconite, Minn.

struction contracts with the result that, I am sure you will be pleased to know, I am modifying existing instructions to contracting officers so that in the case of lump sum construction and dismantling contracts, the usual practice will be followed of publicly opening bids and of furnishing bidders, having a bona fide interest, with lists of prospective bidders and with plans and specifications prior to such public opening. Exceptions will be made only when negotiating fixed fee contracts for projects classified for security reasons and for unusual cases considered not in the public interest. Our policy is to use the fixed fee form of contract only when required by special considerations, such as the situation where time does not permit the preparation of detailed plans and specifications before the work must start.

"Emphasis, however, must still be placed on the necessity of negotiating with bidders to obtain a reasonable price to the Government. The low bidder will, of course, be in the most favored position."

See Annual Construction Volume of $21,000,000,000

The construction industry should work toward "a reasonable plateau of activity which should be somewhere in the neighborhood of $21,000,000,000 annually five years after the end of the war," Representative William M. Colmer, chairman of the House Special Committee on Postwar Economic Policy and Planning, declares in the Annual Directory Issue of The Constructor, official publication of the Associated General Contractors of America.

"After it has caught up with urgent demands for construction," he continues, "the aim of public policy should be to keep in mind a reasonable plateau for the construction industry, representing the highest level of employment that can be sustained without making the industry take the tailspin that would follow an undue forcing of the industry to boom proportions.

"What this plateau will be must depend, of course, upon the level of national income. Thus, if we assume the currently popular estimate of around $140,000,000,000 (at 1943 prices) of net national income as representing a prosperity level to be reached by the fifth year after the end of the war, and if we assume that 15 per cent of the national income represents a high level of activity for construction, a goal would be somewhere in the neighborhood of $21,000,000,000. About one-fourth of that amount would be for maintenance and current repairs, leaving between $15,000,000,000 to $16,000,000,000 for new construction and major alterations."

The construction industry enters significantly into the whole problem of national postwar prosperity, Representative Colmer explained. In boom times construction tends to lead the business procession to high peaks of employment. In depression it is the construction industry that usually falls the hardest and tends to intensify the general depression.

"At present construction employment is at low ebb because of limitations imposed by the war effort in other directions," he says. A reasonable period must be allowed for the industry to be restored to normal peacetime production. During this period a heavy demand, deferred by the war, will be pressing upon the construction industry. Reasoned estimates indicate that during the five years following the end of the war not less than $15,000,000,000 of new industrial plant and commercial construction will be required by American business. Over the same period private housing will need to be replenished at an average of about 275,000 dwelling units per year.

"These figures represent construction demand, exclusive of deferred maintenance and repairs, both public and private, which together will average nearly $6,000,000,000 annually."

When the construction industry returns to peacetime full capacity, he adds, the federal government should be fully prepared to participate in holding construction at a level that can be sustained "without courting sudden deflation in the industry."

"The federal government," he contends, "should take the lead in planning for a healthy relationship between total construction and total national income. It should co-operate in the timing of both federal public works and non-

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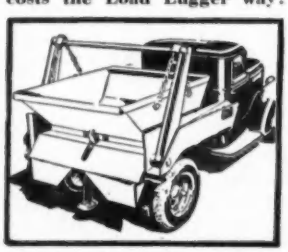
is "a natural" for handling materials, excavating, quarrying, road building, etc. One carrier (Load Lugger) with 5 to 10 detachable bodies (buckets) can transport more yardage per day than a fleet of ordinary trucks. Saves time, conserves manpower and beats the truck shortage. Note the simplicity of the Load Lugger . . . it mounts on any standard chassis . . . only 15 seconds for loading or dumping. Cut your costs the Load Lugger way!



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RHUDE & FRYBERGER contracted stripping at Scranton Mine, Hibbing, Minnesota, moved in three Super C Tournapulls last October, cleaned up the job on schedule.

They say . . . "On a two-mile round trip these units hauled 3.7 loads of 10 cu. yds. per hour under adverse pit conditions. We are sure that the conventional heavy truck could not be operated in the pit area where these Tournapulls were used."

Stripping was in sandy overburden with some gravel and clay mixed in. Here, the Tournapulls' big tires gave plenty of flotation and traction to pull through the loose footing and soft spots where small-tired hauling units bogged down. Adverse hauling grades ranged from 4 to 10%. Time was saved on the waste area because Tournapulls spread their loads on the move, got back to the pit fast.

53,800 cu. yds. were moved in 1454 unit hours; each Tournapull averaged 37 pay yards per working hour on the two-mile round trip haul.

It will pay you to check Tournapull economies on YOUR next stripping operation. Ask your LeTourneau distributor to show you what Tournapulls can do. See him TODAY.

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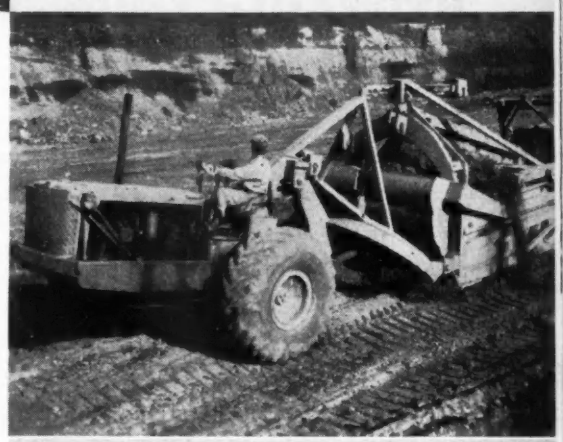

Tournapulls haul loaded up 4 to 10% adverse grades, averaged 2-mile round trips of load, haul and spread every 16.2 minutes.

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federal public works so that they may not force up the bidding for construction during high business activity and so that they may help to take up the slack in low points of construction activity."

Ask State's Opinions on National Airport System

Resolutions asserting that federal grants for construction of city and county airports should be channeled through the states and that the states should be consulted about plans for a national airport system were adopted by the Indiana Commission on Interstate Co-operation.

The action was taken after the commission heard Hubert Gallagher, associate director of the Council of State Governments, criticize the direct federal aid airport plan as embodied in two bills before Congress.

"Airport construction with federal funds is a three-way job," Gallagher contended. "Federal, state and local units of government should all be consulted about the type of airports to be constructed and their locations."

Pointing out that if Congress approves direct federal aid for airport construction, eventually it will probably approve direct grants for all types of public works, he asked: "If that goes through, what will become of our state governments?"

State governments should have some voice in charting a master airport plan for the nation, according to Gallagher, who said: "The state government rather than federal government is the appropriate body to secure co-operation as to the selection of airport sites and to settle disputes between cities about the location of these airports."

Unless the states are consulted, needless overlapping of federal and state aviation administration and wastage of funds would result, he warned.

Phillips Returns to Civilian Work

Ed P. Phillips of Richmond, Virginia, terminated his service as head of the Machinery Division of the Office of Surplus Property, Department of Commerce, having completed a year in that capacity. He will return to the full-time direction of his own companies in Richmond, Virginia, Washington, D. C., and Baltimore, Maryland.

Mr. Phillips was requested to join the staff of the Treasury Department's Office of Surplus Property in July of last year in order to assist in setting up the disposal program for construction equipment and farm machinery. The Office of Surplus Property was transferred to the Department of Commerce in May of this year and placed under the direction of William S. Bradley.

Mr. Phillips is responsible for the development of the nationwide Synchronized Spot Sales Program which is producing gross sales monthly of approximately a million dollars. During the past year, the Machinery Division, through the 11 Regional Offices of the Office of Surplus Property, has disposed of approximately 35,000 units of construction and farm machinery with a total recovery in excess of $17,000,000.

Galvin Sees Prosperity For Construction Industry

E. R. Galvin, president of the Tyson Bearing Corporation, Massillon, Ohio, outlined the prospects for the construction machinery industry during the ten years following the war's end in a recent address before the New York Society of Security Analysts.

Mr. Galvin has spent many years in the construction machinery field and is a past president and member of the board of directors of the American Road Builders' Association.

Since assuming the presidency of the Tyson Corporation, Galvin has continued to keep in close touch with the construction industry, believing that public construction is a stabilizer against depressive economic conditions.

According to Galvin there are eight major factors which contribute to the very bright outlook for the construction machinery industry.

They are:

1. Important improvements in equipment resulting from intensive military use of construction machinery.
2. Greatly expanded foreign markets.

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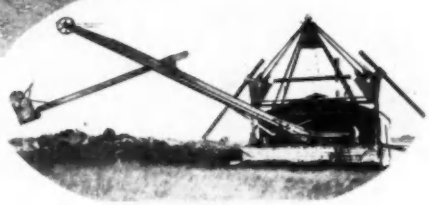

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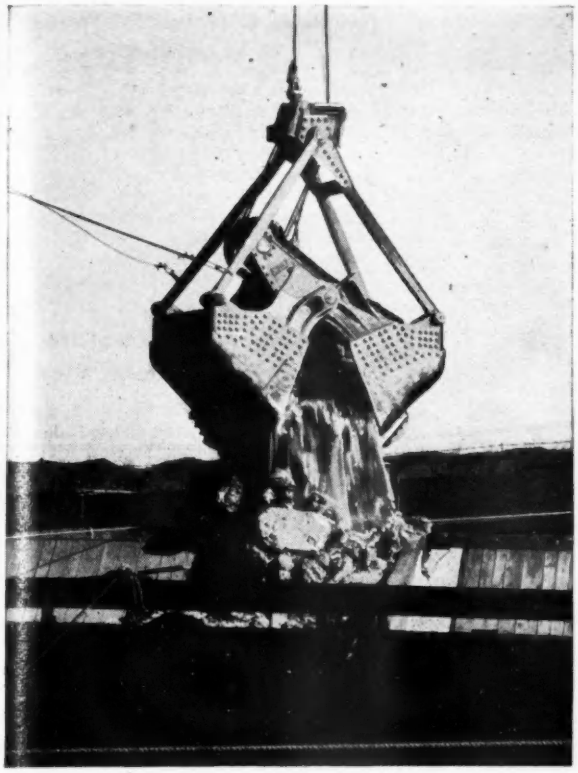

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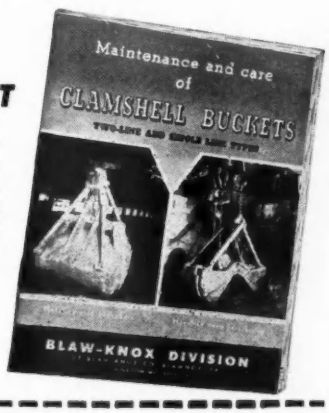
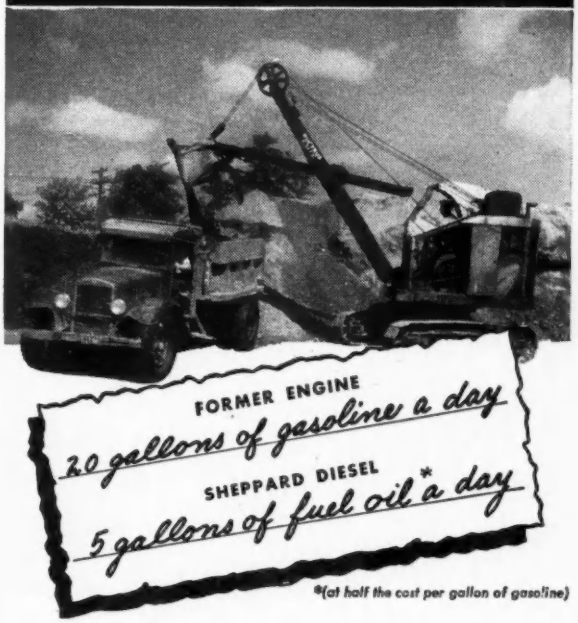


FUEL CONSUMPTION RECORD ON BUCYRUS-ERIE SHOVEL



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also resulting from wide-spread "sales demonstrations" by our armed forces construction battalions as well as from building programs in foreign lands.

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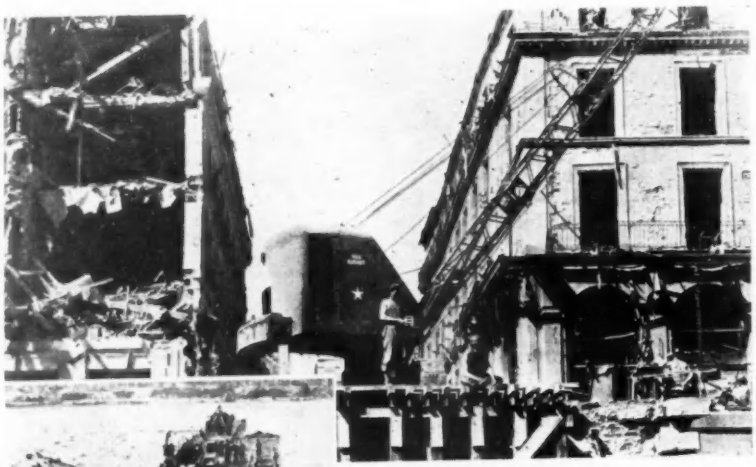
Reviewing the huge post-war construction expenditures estimated by various authorities, Mr. Galvin revealed that these budget estimates range from 12 billion to 26 billion dollars.

Included in these estimates are major highway construction projects, maintenance of highways necessarily neglected during wartime, flood control programs, irrigation development, civilian airport expansion, housing, public building, factories for peace-time production, increased sewage and water facilities, etc.



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Highway Officials Postponed Meeting

The annual meeting of the American Association of State Highway Officials, normally held in November, has been cancelled this year because of the critical transportation situation. The action was taken by the Executive Committee of the Association at a meeting last month in Washington, and was announced by Herman A. McDonald, of Massachusetts, President.

Tells of Arkansas State Highway Conditions, Plans

Double loss of funds which otherwise would be used to match federal aid for postwar highway construction will result from accelerated wartime deterioration of Arkansas highways, it was declared by Chairman W. Harold Sadler of the Arkansas State Highway Commission.

"We have attempted to conserve our construction funds whenever possible in order to match the maximum amount of federal funds available for postwar construction," he said, "but extensive flood damage in addition to the wartime increase in rate of highway deterioration has left us no choice. It is necessary to keep maintenance at a certain level in order to protect our present highway system."

Sadler said Arkansas highways are deteriorating and becoming obsolete at a rate of $6,000,000 each year, while highway maintenance funds amount to $3,075,000 annually. This is a lower maintenance allowance than that of any bordering state, he said, while Arkansas ranks high in bridge and highway requirements.

Stressing the importance of filling gaps in the state's present highway system before attempting to build superhighways, he declared: "It would require a minimum of $200,000,000 to complete our entire system as it stands today, almost as much as we have spent since the start of the state's highway program.

"This commission is committed to close gaps in the present system and we must set sensible objectives. This alone would cost the taxpayers $80,000,000. However, if the Bureau of Public Roads will accept our proposals perhaps we can build in Arkansas for approximately $45,000,000 the $80,000,000 program which previously has been a postwar objective."

Sadler explained that the commission hopes to attain this program by securing permission to use lower standards than have been set up by the federal bureau for primary and secondary federal-aid roads, since the lower standards still would represent better construction than was used on many of the state's present paved highways.

Emphasizing the importance of improving the state's highway system if hoped-for development of the state is to be achieved, he said: "Despite all the excellent work of the State Resources

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KUBIT IMPACT BREAKERS

• Assistant Commissioner Kenneth Markwell is a key figure in the program of the Bureau of Reclamation for extensive post-war development of Western resources. With a wide background of administrative experience in construction of engineering works, he joined the Bureau in 1944 to assume a major role in directing the operations of an agency whose multiple-purpose projects for harnessing Western rivers has brought more than four million acres under irrigation and made it the largest producer of electric power in the world. The end of the war is expected to bring an expansion in the Bureau's development program and it recently laid before the Congress plans for construction of 415 projects in 17 Western states.

Development Commission and other agencies seeking development of the state's resources, there is a limit beyond which we cannot progress without adequate transportation facilities. During our highway inspection tours through the state, we have come to realize vast potentialities of Arkansas which cannot be developed in an aura of dust and gravel. Our first objective is to give Arkansas paved roads and adequate bridges so that all areas will have transportation facilities equal to their potential production."

Three States Study Bills to Regulate Strip Mining

By BETHUNE JONES

Bills to provide more stringent regulation of strip mining became live issues this year in Illinois, West Virginia and Ohio, with West Virginia being the only one of the three states in which such legislation became law.

Gov. Dwight H. Green vetoed Illinois bills to tax coal from strip mines four cents a ton, the revenue to be used to level and restore land abandoned after strip mining operations. In rejecting the measures, Governor Green said that the proposed strip mine tax not only was contrary to his policy against additional taxes, but it would be discriminatory.

A 1943 Illinois law requiring strip mine operators to level and restore mine spoil ridges is not being enforced because of a court injunction.

"The bills single out strip mine operators from the general class of those who mine coal or who extract other minerals from the earth," Governor Green said in his veto message. "Importance of this legislation is such that it would seem advisable for the General Assembly to explore the question of whether those engaged in related lines of industry should be similarly taxed, if any tax is to be imposed at all."

Illinois strip mines last year produced about 16,000,000 tons of coal, as compared with a total Illinois output of 75,000,000 tons.

Stating that the governor was to be congratulated for his veto, Frank F. Kolbe, president of the Illinois Coal Strippers' Association, and head of the United Electric Coal Companies, said: "We are going ahead anyway to improve the land that has been strip mined. My company intends to cut spoil piles down into smaller ridges and to plant orchards and clover for pasture. We have an experimental orchard in southern Illinois now. Free enterprise will work out this problem better without government dictating some plan that may be economically unsound."

J. F. Maloney, vice president of another firm member of the Illinois association, said that for 10 years strip miners have been engaged in forestation of abandoned strip mines. This, he said, not only adds beauty but builds up a needed lumber reserve.

Gov. Clarence W. Meadows permitted

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GENERAL ELECTRIC

• The town of Agana with a portion of the wreckage in the background is a blasted relic of the American victory of the Marianas. American soldiers quickly installed gasoline-powered pumps to drain off stagnant water and thus reduce disease.

PAW Photo by Corsini

a strip mining control act to become West Virginia law without his signature. As finally enacted after much legislative controversy, the new West Virginia statute requires a $50 registration fee and $500 per acre bond to insure reclamation of land after mining is ended. Operators are required to level land and plant cover crops under regulations set up by the state mines department and university experiment station. Violation calls for a $1,000 fine or a year in jail. Strip mines actually in operation March 10, 1945, are exempted.

A proposal providing rigid regulation of coal strip mining in Ohio, similar to the new West Virginia law, was sidetracked by the Ohio Legislature, which enacted instead a measure providing for the creation of a nine-member commission to study the problem.

Open Boise Headquarters of Idaho Branch of PRA

In preparation for expanded postwar road construction in Iowa, headquarters have been opened in Boise by L. M. Huggins, district engineer for the newly created Idaho office of the Federal Public Roads Administration.

The Idaho office was separated from the Utah office in Ogden following a conference of federal and local public roads officials who found that the amount of work to be done after the war was more than could be handled by one main office for two states.

Huggins estimated that a total of $10,500,000 to $11,000,000 would be available in federal and state funds for the construction of highways in Idaho in the first three postwar years. Seventeen employes were transferred with Huggins to the new Idaho office, with this staff to be augmented later.

Brazil Has Funds to Buy U. S. Road Machinery

More than $5,000,000 worth of tractors, trucks and other highway building machinery will be shipped to the state of Sao Paolo, Brazil alone as soon as the war ends, Senor Carlos da Silveira Lichtenfels told representatives of the American Road Builders' Association and the Office of Inter-American Affairs at a conference. The distinguished Brazilian highway engineer on leaving Washington will spend several months visiting American plants producing highway construction machinery and calling on state highway departments to study up-to-the-minute planning, construction and maintenance methods as practiced in the United States. His itinerary is being worked out to give a comprehensive picture of all phases of road building in this country.

"The state of Sao Paolo expects to build 3,000 kilometers of new highways and improve 6,000 kilometers of existing roads in the next five years," Sr. Lichtenfels told his conferees. "This will include the completion of two super-highways of 145 kilometers and involve the movement of 12 million cubic meters of earth.

"The highways to be improved in-

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The upper picture shows an International TD-18 Diesel TracTracTor equipped with bulldozer moving a big bite of dirt on a highway project.

The smaller picture shows an International TD-9 Diesel TracTracTor nudging a large rock out of its way so the road can go through.

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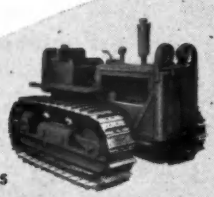

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clude the radial highways which branch out from Sao Paolo like the spokes of a wheel, while new construction will comprise transverse roads uniting the radial highways like a spider's web. The estimated cost of this program is $16,900,000 of which 75 per cent has been raised by an issue of seven per cent state highway bonds purchased at 103 by the banks of Sao Paolo. The remaining 25 per cent will be secured by taxation," the visitor stated.

Sr. Lichtenfels who until recently has been in charge of the planning and location of the mountain section of the Via Anchieta Highway uniting the Brazilian coffee port of Santos with the industrial city of Sao Paolo, painted an optimistic picture of postwar highway construction in South America, and referred to the admiration of Latin-American engineers for our machinery and methods. His visit to the United States is to secure advanced techniques of building and maintenance which he can take back to Brazil.

The Via Anchieta, of which Senor Lichtenfels was chief engineer of the central or mountain stretch of 34 miles, presented many interesting engineering features. Here in a distance of eight miles, the road rises from near sea level to 2,400 feet. The highway is split into two distinct routes, the up road and down road following the valley of the Piloes River. These two roads each have a surface of 23 feet and do not run exactly parallel, but wind about crossing over and under each other as they span valleys on bridges and viaducts, and pierce the mountains through tunnels. The up road, which was built first, has a maximum grade of six per cent and curves with a minimum radius of 328 ft. The down road has grades up to seven per cent. Traffic, it is planned, will move with safety at 72 miles per hour on the plateau section and 50 miles per hour through the mountains.

Sr. Lichtenfels was graduated from McKenzie College in Sao Paolo. He speaks French and Portuguese as well as English. His tour of industrial United States is under the auspices of the Transportation Department of the Office of Inter-American Affairs. Highway officials, civic bodies and manufacturers are arranging extensive tours of inspection for this South American visitor.

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Massachusetts Has Six-year $156,000,000 Highway Program

Gov. Maurice J. Tobin has signed a bill providing for a six-year $156,000,000 highway construction program in Massachusetts. The program will be financed entirely by gasoline tax receipts. The third cent of the state's three-cent gasoline tax rate, which had been levied on a "temporary" basis since depression days, was re-enacted by the 1945 Massachusetts Legislature to remain in effect until 1952.

The total of all construction contracts awarded in the 37 eastern states during the first six months was $1,482,399,000 compared to $960,221,000 in the corresponding period of last year, a gain of 54 per cent, the Dodge corporation reported.

Nonresidential construction in the first half amounted to $807,612,000, an increase of 106 per cent. Residential construction declined from $203,892,000 to $197,509,000. Public works and utilities totaled $477,278,000, an increase of 31 per cent.

Manufacturing building construction contracts aggregated $515,806,000 in the first six months to establish a gain of 162 per cent over last year's $197,077,000.

Continued improvement in the position of privately owned construction as compared with publicly owned construction was revealed by Dodge's tabulations.

Privately-owned construction construction contracts in the first six months totaled $573,491,000 compared to $243,543,000 in the corresponding period of last year. Privately-owned construction in the first six months represented 39 per cent of the total of all contracts. It represented 25 per cent of the total in the first half of 1944.

Reach Halfway Mark on Anderson Embankment

The halfway mark has been reached on the embankment of Anderson Ranch Dam, located 75 miles southeast of Boise on the South Fork of the Boise

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River, R. J. Newell, Acting Regional Director for the Federal Bureau of Reclamation, announced.

Mr. Newell explained that construction crews had 4,327,280 cu. yds. of material in place on July 18, exactly half of the 8,654,560 cu. yds. of material which will constitute the embankment when completed.

When completed in the winter of 1947-48, Anderson Ranch Dam will be the highest earth-fill dam in the world with a height of 456 feet.

The structure is being built by the Bureau of Reclamation for the purpose of providing supplemental water for existing farm land on the 324,000-acre Boise Project, which has been suffering from shortages. The reservoir's ultimate capacity will be 500,000 acre-feet of water, and the Bureau and its contractor, Morrison-Shea-Twaits-Winston Company, is rushing work this summer to have facilities ready for the storage of at least 45,000 acre-feet next spring.

Award of a $93,840 subcontract, by the prime contractor, to J. G. Shotwell of Albuquerque, New Mexico, for the processing of 68,000 cu. yds. of concrete aggregate for Anderson Ranch Dam was also announced by R. J. Newell.

The Bureau has authorized the Morrison-Shea-Twaits-Winston Company, the prime contractors on the project, to award the subcontract for the aggregates. The material will be used to complete concrete work on the powerhouse and spillway.

Meet on Unified Engineering Standards and Practices

A conference between the United States, Canada and Great Britain on unification of engineering standards and practice will be held in Ottawa, Canada, on September 24, 1945, the Combined Production and Resources Board announced.

This will be the third in a series of such conferences that have been held during the last two years under auspices of CPRB.

Included in the agenda for the meetings are the standardizing of screw threads (including pipe threads), limits and fits, drawing practices and metrology in mechanical engineering.

The national standardizing groups of the countries concerned have been closely identified both with the work of the conferences and with developing resulting proposals. It is hoped, as a result of the third conference, that the differences in practices among the three countries will be reduced still further and that a series of common standards necessary in connection with their joint military requirements will be ultimately achieved. The further benefit that will accrue from such standardization during peacetime need hardly be emphasized, CPRB said.

The development and acceptance of common standards will take time, CPRB cautioned. In view of this, it has been pointed out that insofar as screw threads are concerned, there is no intention of seeking an immediate and complete scrapping of plants, equipment and stockpiles, which would cause widespread disruption in industry.

Most of the production equipment affected would be tools and gauges, expendable items that are continually being replaced and are therefore a normal expense under any circumstances. There is little doubt that these costs are at present much greater than they would be if standardization were more widely extended. Expenditures necessary in the gradual change-over should be considered, CPRB said, in the light of the savings that would ultimately result.

To Spend $100,000,000 on 170 New Airports in Ill.

A minimum of $100,000,000 will be spent by Illinois communities during the next 10 years for the construction of 170 new airports, it was predicted by Ben Regan, chairman of the Illinois Aeronautics Commission.

Regan, a holdover by executive order pending Gov. Dwight H. Green's appointment of a director for the newly created Illinois State Department of Aeronautics, said his estimate did not include an additional expenditure for constructing an international airport equipped for seaplane landings on Chicago's lake front. He contended that the latter facility must be built if Chicago is to realize its ambition to become the center of world aviation.

Illinois now has 80 standard airports,

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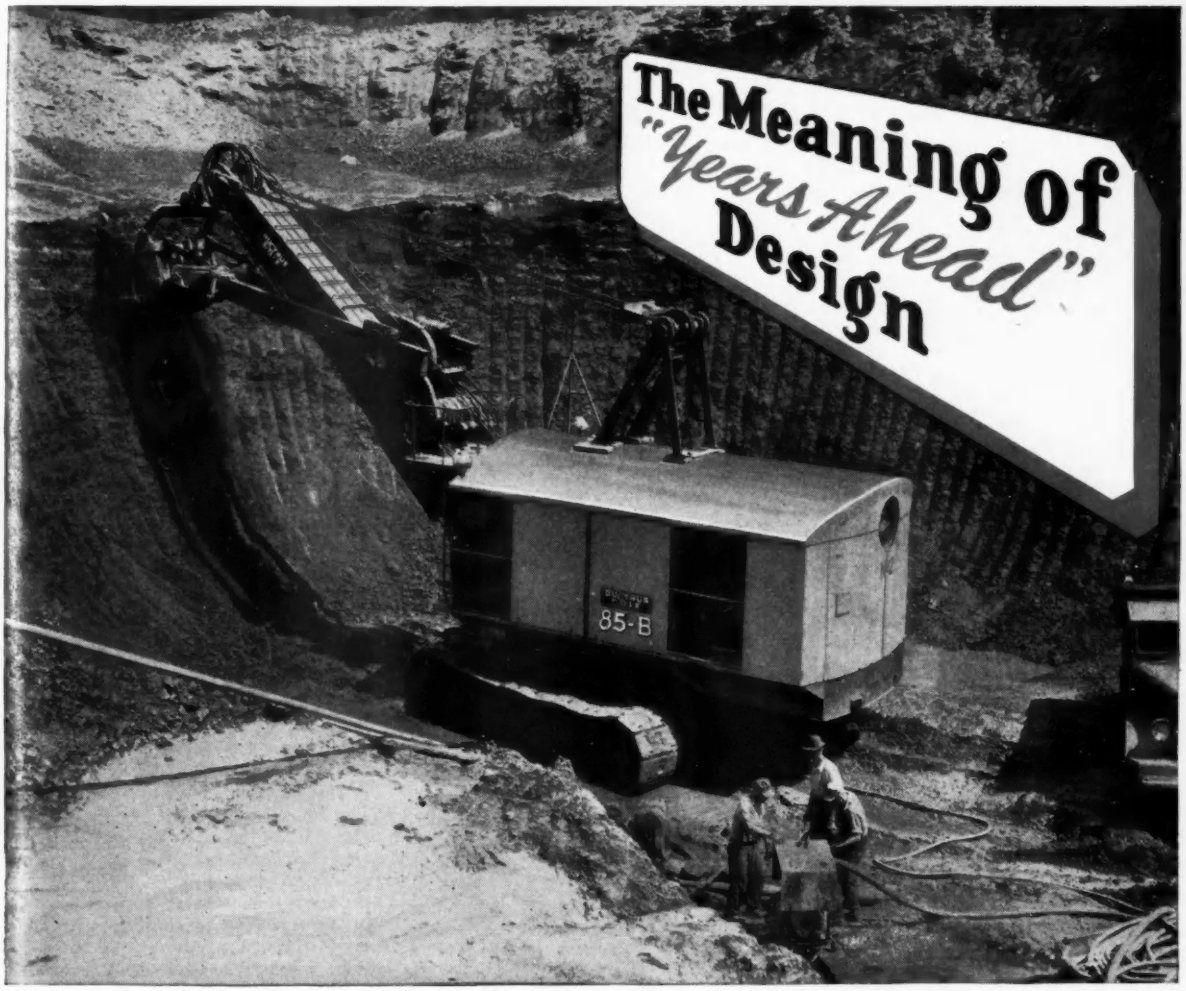

IMPORTANT new designs and improvements are rarely the results of good luck; most of them come the hard way, from intensive research by skilled engineers working with ample facilities and a thorough knowledge of the field. That's especially true of mining shovel design, where so much depends on constant close contact with current field problems, on engineers with the "know how" to develop practical ways to solve those problems, on manufacturing facilities extensive enough to permit really progressive design. To these must be added an ever-present determination to build the finest possible equipment; to consider thoroughly suggestions and recommendations from the men on the job, with the aim of steady improvement.

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of which 20 are in operation in the Chicago area. It also has 23 airports in various stages of improvement and construction and an additional port at St. Charles that Norman C. Bird, state airport engineer, reported was being readied by the federal government to be turned back to civilian use. The 170 new sites forecast by Regan will give the state 250 airports by 1955.

Present Illinois airports range in size from class 1 to class 4. Classification is governed by the length of runways. A class 1 airport is from 1,800 to 2,500 feet long; class 2 from 2,500 to 3,000 feet; class 3 from 3,500 to 4,500 feet; class 4 from 4,500 to 5,500, and class 5 airports are 5,500 feet or longer.

While there are no class 5 fields in Illinois now, Regan predicts that several will be built in the next decade, as well as additional class 3 and 4 fields. The larger ports, he said, will be constructed near principal population centers. Bulk of new construction as contemplated by the Illinois Postwar Planning Commission, he emphasized, however, will be concentrated on class 1 and 2 airports to accommodate the private (non-scheduled) plane owner. Regan said that the small plane owner, in the opinion of aviation authorities, will provide 97 per cent of postwar air traffic.

Col. George C. Roberts, acting head of the State Department of Aeronautics and former secretary of the Illinois Aeronautics Commission, pointed out that most privately-owned planes are flown for pleasure. The education job that lies ahead, he said, calls for reversing the present 80 per cent pleasure trend, so that private planes in the future will be flying only 20 per cent for fun and 80 per cent for business.

Roberts and Regan said that Illinois aviation development on a gigantic scale is assured as a result of various bills enacted by the 1945 session of the state legislature.

Kaolin or China Clay In 1944

Although sales for some uses, such as rubber compounding, have declined, war conditions have not seriously interfered with kaolin production according to figures released by the Bureau of Mines, United States Department of the Interior. During the five-year period 1940-44 output of kaolin in the United States averaged 43 per cent higher than in 1935-39. Since 1941, volume has been slowly receding—in 1944 it was six per cent lower than in 1943.

Georgia furnished 77 per cent of the tonnage, South Carolina 14, and most of the remaining nine per cent came from North Carolina, Florida, and Pennsylvania.

Although in wartime the consumption of kaolin in paper is limited by the need for the stronger types of paper used in packaging that industry as usual took the lion's share, 59 per cent of the total in 1944. Refractories consumed 12, pottery 10, rubber seven, and remaining 12 per cent went into a variety of products such as chemicals, paints, and plasters.

In harmony with the general decline in furnace construction, 30 per cent less kaolin was used in refractories in 1944 than in the previous year.

The tonnage of rubber kaolin increased 17 per cent but only minor significance can be attributed to the rise. Synthetic rubber compounding requires large quantities of carbon black in preference to clay type fillers, and in 1944 a serious shortage of carbon black encouraged the use of more clay than might otherwise have been considered desirable. The future size of the rubber-clay market remains to be determined by research in synthetics and policies governing post-war importation of natural rubber.

Demand for pottery kaolin has been very steady during the past three years.

Prices of china clay changed little during 1944. The national average value as reported by producers was $9.00 per ton, compared with $8.68 in 1943, and $8.49 in 1942.

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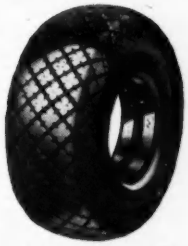

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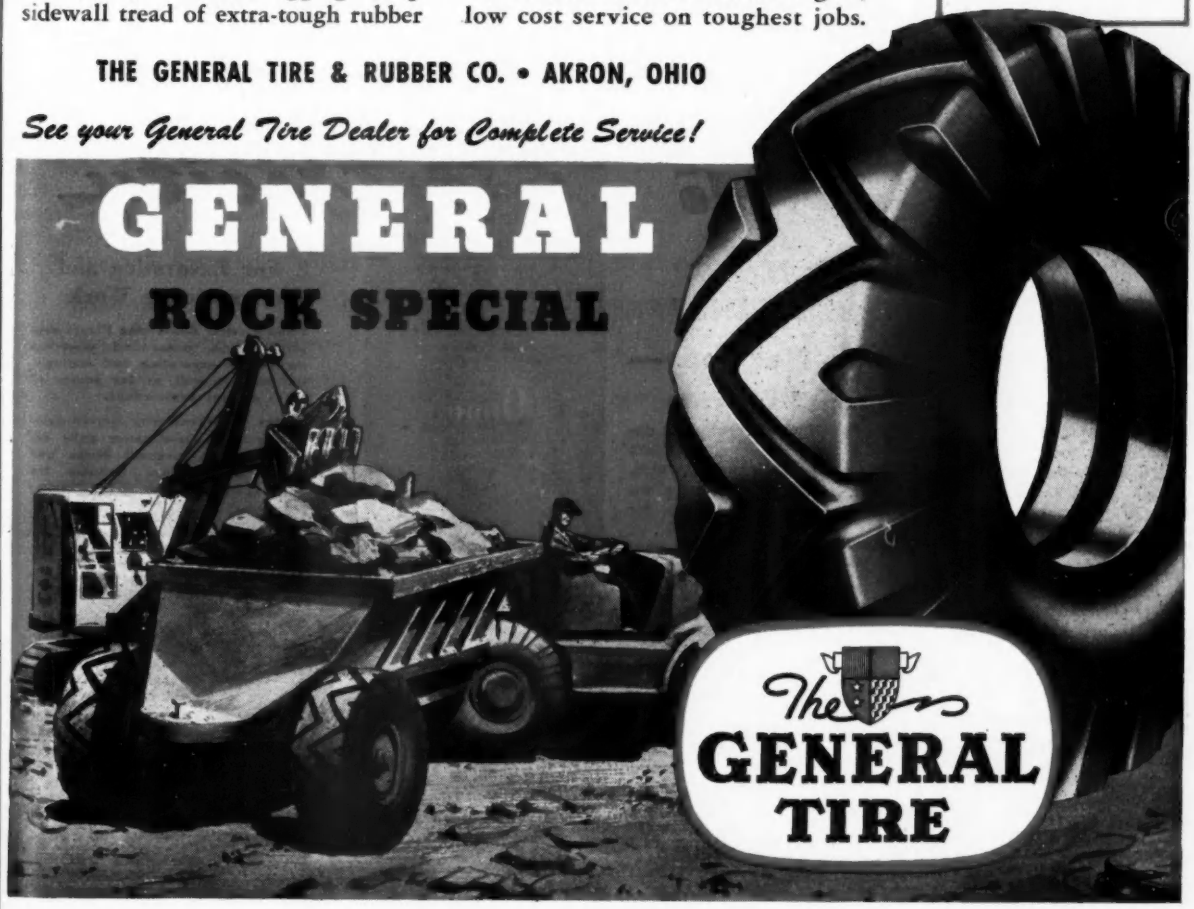

• **Good military roads, of vital necessity to the armed forces' transportation system, were built on Guam as soon as the Seabees could prepare the foundations.**
PAW Photo by Corsini

Give Rules for Foreign Sale of Surplus Property

The Army-Navy Liquidation Commissioner's Office has directed its field commissioners to give priority in the purchase of overseas surplus to U. S. Government agencies for their use in foreign areas, according to Commissioner Thomas B. McCabe, who is in Europe conferring with his field commissioners.

The directive was issued as a result of the establishment of overseas surplus sales priorities by the Surplus Property Board in an amendment to Regulation 8, which governs overseas sales disposal, McCabe said.

Top priority will include sales of overseas surplus to the Foreign Economic Administration, not only for its own use in foreign areas, but also when acquiring property under Lend-Lease appropriations, or for UNRRA.

The next opportunity to make purchases is accorded to American nonprofit institutions. These institutions include any American scientific, literary, educational, public health, public welfare, charitable or eleemosynary institution, and any hospital or similar group, as defined in the amendment to SPB Regulation 8.

American manufacturers or distributors come next in the order of priorities for the purchase of surpluses with their own name or trade mark, for use or disposal in foreign areas, so that they will be in a position to protect their brands and to repair, service and distribute their merchandise in an orderly fashion. All purchases of this character will naturally be subject to the regulations of the country in which they are to be sold.

Foreign Governments are next in the order of priorities, regardless of the location of the surplus property, in making purchases for relief, rehabilitation and reconstruction purposes, as may be determined by the field commissioners, after consultation with the State Department or its missions, and the Foreign Economic Administration.

Next in order is the country where the surplus is located, if it is desired for purposes other than relief, rehabilitation and reconstruction; and, finally, any other purchasers, including any other foreign governments as may be determined by the Field Commissioners.

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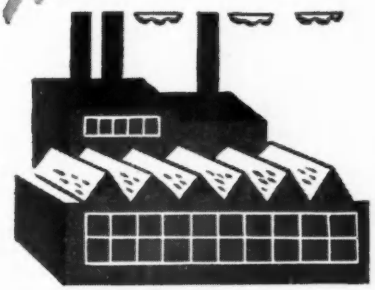

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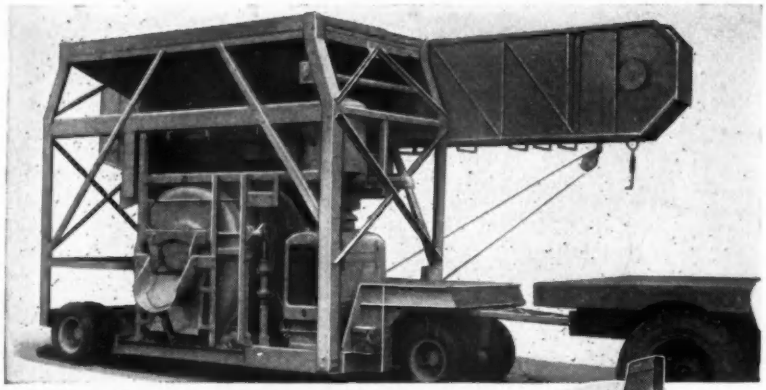

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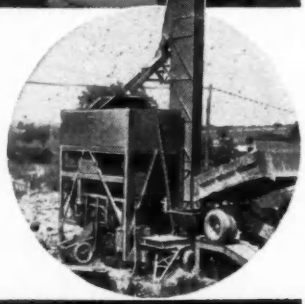

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Digging, hauling and automatic dumping are merged into a continuous, rapid operation controlled by one operator. Power requirement is moderate. Maintenance is simple.

Sauerman machines offer handling capacities from 10 to 600 cu. yd. per hour and operating spans from 200 to 1500 ft. Specifications of the various sizes and types of machines, together with illustrations of their uses are given in the Sauerman catalogs. Write for this literature today.

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may utilize the 'dollar priority' whenever and wherever possible, in line with our established policy of selling for dollars when they are available," McCabe explained. "We recognize that it is our duty to see that the American taxpayer receives, wherever possible, the fair value of the property based upon its original or replacement cost, and the condition and utility at the time of sale. There will be no attempt to profit from existing scarcities and no more than a fair price will be charged in any case.

"If in their opinion the fixed price is too high, prospective buyers may make offers at a lower price. The Commissioner will then determine whether to accept the highest price offered or make some other disposition. He will reserve in all cases the privilege of rejecting any and all offers. He will also make allocations, whenever necessary, on the basis of need, in cases not involving the priority of government agencies. However, insofar as there are dollars or dollar exchange available in foreign countries, we want to sell as much surplus as possible for immediate cash payment. Sales to foreign governments may, however, be made for local currency where the Secretary of the Treasury and the Secretary of State so direct. In this determination special consideration to the economy of each prospective foreign government is given according to the objective of the Congress as set forth in the preamble of the Surplus Property Act."

All sales will be subject to certain conditions:

A. No customs, duties or similar charges on the property will be levied against the United States;

B. Goods will be sold "as is" without warranty except as to title;

C. Goods will be sold where they are and possession must normally be taken within 30 days from the date of sale;

D. Where the purchasing government plans to sell surplus stocks, provision will be made that the distribution does not discriminate against U. S. concerns doing business in that country;

E. With minor exceptions, no surplus property purchases can be reimported into the United States in the same or substantially the same form.

"Another highly important point," McCabe said, "is that the representatives of the various groups must assume the responsibility of informing themselves of available surpluses. All sales will, of necessity, be made through the field commissioner in each area, and no attempt will be made to effect the sale of foreign surpluses through the Commissioner's office in Washington."

Mr. McCabe also stressed the importance of priority claimants acting without delay in establishing contacts with the field commissioners, because the time during which the surplus and residue can be held by the ANLC Field Commissioners will be limited. Their addresses can be secured from the ANLC Office in: The New War Building, 21st and Virginia Avenue, Wash-

ington 25, D. C. This time limit is necessary because the commissioners must dispose of the surplus without undue delay, so as to get our troops home as rapidly as possible and to avoid any unnecessary loss from deterioration or from "missing the market."

The Central Field Commissioner is now operating in the European Theater with offices in Paris, London and Rome. The Paris Office is 29 Rue de Barri; the London Office is 9 Stanhope Gate, West 1, London; the Rome Office is care of the U. S. Embassy, with a branch office at Caserta. An office is being established in Cairo, Egypt, for the disposal of surpluses in the African-Middle East Theater. Its temporary address is care of the American legation. The field commissioner in the Persian Gulf Command, with headquarters at Teheran, is already in operation under the general supervision of the Cairo Office.

Mr. McCabe said that as soon as other Field Commissioners are established and ready to function, their names and addresses will be released to the American manufacturers through the general and trade press, Secretaries of Trade Associations, the U. S. Chamber of Commerce and all other public media.

Award Contract for First Section Friant-Kern Canal

A contract has been awarded and work will be started soon on construction of the first 5.6-mile section of the Friant-Kern Canal on the Central Valley Project in California, it was announced by Acting Secretary of the Interior Abe Fortas. The contract was let to the Peter Kiewit Sons' Company of San Francisco on its low bid of $1,163,340.

The Friant-Kern Canal is one of the major features in the Bureau of Reclamation's development program for the Central Valley Project and will provide irrigation water for more than 700,000 acres of highly productive land in the San Joaquin river valley. Acting Commissioner of Reclamation Kenneth Markwell said that when completed the canal will extend for 156 miles from Millerton Lake, the reservoir created by Friant Dam, south to the Kern River near Bakersfield.

"Construction of this first section of the canal will help to provide jobs for returning servicemen and for workers being released from California war plants," Markwell said. "When extended to its full length, the canal will insure continued production on San Joaquin lands now faced with water shortages and, in addition, will open up settlement opportunities for several thousand families on newly irrigated farms. The Bureau plans to expedite construction of the canal as rapidly as materials, manpower, and funds are available."

The initial construction, authorized by the War Production Board, will be for a distance of approximately six miles from Friant Dam to Little Dry Creek in Fresno County, and will include earthwork, concrete lining, and canal structures. The canal will have a base width of 36 feet and a normal capacity of 4,000 second-feet.

The Friant-Kern Canal when completed will provide for the irrigation of 358,000 acres of new land and furnish supplemental water for an additional 374,000 acres threatened by shortages because of dwindling underground supplies. The 37-mile long Madera Canal, completed this summer by the Bureau, also taps the Friant Dam reservoir, and the canals together will eventually provide irrigation water for more than a million acres of fertile San Joaquin valley land. Surplus water from the Sacramento River will be transferred by the Central Valley system to the San Joaquin Valley to meet irrigation deficiencies in the latter.

Private Construction Shows Substantial Gains

Marked by a pronounced recovery in privately-owned manufacturing building, construction activity in the 37 states east of the Rocky Mountains showed substantial gains in the first half of the year, it was reported by F. W. Dodge Corporation.

All major classifications of construction showed gains over the first half of last year except residential building.

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Regardless of where or how rope is used, the work is generally plenty tough. Heavy loads, bending stresses, abrasion, and sudden strains are only a few of the things that make it so.
"HERCULES" (Red-Strand) Wire Rope is designed to meet just such conditions. The first step in its manufacture is the determination to produce a product which will be consistently long lasting—dependable—economical.
Proof is in performance, and for over sixty years, this tough and dependable wire rope has demonstrated its ability to meet the requirements of peacetime progress, as well as the demands of great emergencies.
In "HERCULES" there is a correct type and construction of wire rope for every heavy duty purpose, as it is made in both Round Strand and Flattened Strand constructions—all of which can be furnished either Preformed or Non-Preformed.
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NOT in the Contract

Gob: "I tried to get drunk last night but couldn't."
Mate: "Why not?"
Gob: "The flesh was willing but the spirits were weak."

Two men were climbing a telephone pole to repair a cable. A woman driving in her automobile saw them and remarked to her companion: "Look at those nitwits. From the way they're acting, you'd think I'd never driven a car before."

They tell of the two ambitious little fleas who worked hard and saved their money and finally went out and bought their own dog.

She: "No, I don't smoke, drink, or neck."
He: "Well, then what do you do?"
She: "I tell lies."

"It's four a.m. and I'm not going home to my wife!"
"Say, have you lost your reason?"
"Precisely, I can't remember the reason I had for staying out."

"So you were out golfing with Pedro. How does he use the woods?"
"I don't know. We played golf all the time."

The father of the household was becoming impatient at the lateness of the hour, when he said:
"I can't see why that young twirp calling on Sophia hasn't sense enough to go home. It's past midnight."
The inevitable little brother spoke up and said:
"He can't go, father; sister's sitting on him."

It happened in a crowded elevator. A tall woman in a short fur jacket let out a scream. A small boy directly behind her said, defiantly, "I did it. It was in my face, so I bit it."

"Only last week you said it was a great life if you didn't weaken."
"Yes, but since then I found out that it's a greater one if you weaken just a little bit."

"OK, OK, Gus! Now get down offa that billboard — we've got a whole street to clean up!"

Mandy was in the hospital having a baby. She kept screaming and screaming. Finally a doctor came up to her and said, "Mandy, there is no need to scream so loud—if you would concentrate more you wouldn't scream so much." She paid no attention to the doctor and kept right on screaming. Suddenly she stopped.
The doctor ran over to her and asked what the matter was.
She asked, "Is Jasper still downstairs?"
"Yes," replied the doctor, "he is downstairs pacing the floor."
"Well," said Mandy, "you go right down and tell him that if this is a sample of married life—I don't even want to be engaged!"

The employer called his secretary: "Here, Miss Hunt," he said, "have a look at this letter, I can't make out whether it is from my tailor or my lawyer. They are both named Smith." The letter read: "I have begun your suit. Ready to be tried on Thursday. Signed, Smith."

Mess Sergeant: "You're not eating your fish. What's wrong with it?"
Buck Private: "Long time no sea."

A shoulder strap is a piece of ribbon worn to keep an attraction from becoming a sensation.

An OPA pamphlet on how to make girdles last longer, used the phrase, "It can best be removed by a good strong yank." However, in later editions it was changed to, "It can best be removed quickly by a good strong jerk."

Traffic Cop: What's your name?
Truck Driver: It's on the side of me truck.
Traffic Cop: It's obliterated.
Truck Driver: Yer a liar, it's O'Brien.

Judge Morton: "I'm sorry, Evelyn, I can't issue a license until you've properly filled out your form."
Evelyn: "Listen, Judge, if my boy friend doesn't care, I don't see that it should make any difference to you."

Employer: "Can you give me a reference?"
Prospective Employee: "Here's a letter—it reads: To whom it may concern. We had Sam Jones working for us for three weeks and we can truthfully say we are satisfied!"

If a girl expects to win a husband she ought to exhibit a generous nature, or else how generous nature has been to her.

OUTPUT!

THE MOST COMPLETE lubrication service ever offered to contractors—that's the kind Socony-Vacuum brings you! Here's how it helps you *under-run* time estimates—finish ahead of contract dates.

Out in the field, it means fewer breakdowns. Because our line of quality lubricants is complete, you get exactly the right oil or grease for every application—no matter how unusual.

Expertly scheduled on-the-job deliveries save further field interruptions, help reduce inventory problems. And now that you can get *all* your lubricants from just *one* source, you save time in your office, too. No need for special orders, follow-ups.

In your maintenance department, the Socony-Vacuum Representative expedites work many ways! For instance, he'll supply you with job-tested maintenance schedules and help your men adapt them to your specific requirements. He's also equipped to call in engineering help when needed . . . to instruct "green" help on the Do's and Don'ts of Correct Lubrication for all your machines.

All through your operation, Socony-Vacuum's Complete Lubrication Service for Contractors saves time and money—speeds output . . . so why be satisfied with fuels and lubricants alone!

"ON YOUR STAFF—BUT NOT ON YOUR PAYROLL"—
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CORRECT LUBRICATION FOR EVERY PART OF EVERY MACHINE YOU OPERATE . . .
PLUS
1 ENGINEERING HELP on time-losing operating problems; 2 TESTED MAINTENANCE SCHEDULES that minimize service man-hours—keep equipment on the job; 3 PROMPT, DEPENDABLE DELIVERY—a reliable, on-the-job service that eliminates inventory problems for you!

TUNE IN "INFORMATION PLEASE"—MONDAY EVENINGS, 9:30 E.W.T.—NBC

Casing Blast Holes

(Continued from page 490)

Electricity for running the shovels, drills, and preparation plant and for lighting is generated at the Antioch Power Plant, a plant operated by company interests. This plant uses sludge from the preparation plant after it is run through a table jig washer for generating power. This plant furnishes electricity for the City of Linton as well as for the mine. The mine is equipped with ground resistors and ground trips which automatically trip the switch in the field if any trouble develops in the power circuit.

Two dinky engines belonging to the company handle the gob cars dumping gob into an old pit where it is leveled off with a LaPlant-Choate bulldozer on a Caterpillar tractor.

Special facilities for the workers at the mine include a wash house with five stalls. There is no particular problem of manpower shortage facing the executives at this mine. Men who went into service were replaced by older men.

Spoil piles are planted with tree seedlings after being left to settle for two or three years. To date about 170,000 trees have been planted on the spoil piles, principally pine, cottonwood, and black lotus.

Digging a Garage

(Continued from page 491)

this 24′ x 48′ house had been excavated by manual labor and the house was set on concrete blocks that had been laid in a trench. The front half of the basement, an area 24′ x 24′, plus a 15′ x 10′ area underneath a former porch that extended from the front of the house, was dug out by the Verdev Trucking Company.

The job gave Verdev's recently purchased Bucyrus-Erie Dozer-shovel with a ⅝-cu. yd. bucket on an International TD-6 tractor a good test in maneuverability, low clearance and efficient digging and dirt moving.

Starting from the highway Verdev dug the driveway in toward the house, leaving an elevation at about half the distance of the set-back which was used to carry dirt over the embankment on either side of the driveway for terracing and to fill in the old driveway. The driveway cut was sloped from this ramp to the level of the basement.

When working toward the ramp on the highway side the Dozer-shovel operator dug ahead of himself, raised the bucket to a carrying position, climbed the embankment at the ramp and dumped on either side for the area to be terraced. On the house side of the ramp the Dozer-shovel dug ahead of itself, raised its bucket, and backed up the ramp and then carried its load forward to the dumping place. After dumping the Dozer-shovel was backed onto the ramp and then worked forward to its digging position.

After enough of the basement was dug away so that the Dozer-shovel could be turned around in it, the machine went forward both into the basement and out of the basement with its load.

The cement block basement foundation was not even nicked by the Dozer-shovel and no hand shovelling was necessary to level the floor right up to the block walls. Dumping also required maneuverability since the area was densely wooded.

After the basement excavation was completed the ramp left in the driveway was dug up and deposited on the sides of the embankment. The driveway cut was trimmed with the sides of the bucket in lowered position.

Two small children living in the house were able to take their afternoon naps undisturbed while the basement was being excavated.

In addition to the Dozer-shovel the Verdev Trucking Company operates an Allis-Chalmers tractor with Hough ⅝-cu. yd. loader and four Ford dump trucks. Increased business prompted the purchase three months ago of the Dozer-shovel.

Harbor Stretchers

(Continued from page 495)

sonal message. And what may seem trivial and unimportant to men with bigger, but less human ideas, suddenly turned the tide in developing this personal interest in the job. In re-establishing this unspoken relationship between a dredge captain and his men, Mackie apparently realized that men, like machines, soon run dry unless they are oiled with a little appreciation.

The Seabees are fed excellently by first class cooks Bob Marshall and Walter Skypeck. Three and one-half tons of fresh food storage are provided by refrigerator boxes.

The dredge is tended by a self-propelled anchor scow, on which is mounted a two-drum Waukesha driven Skagit hoist. This machine sets her eight-ton swing anchors ahead. A 225 h.p. tug brings in fuel and does miscellaneous towing, and an LCVP, ordinarily used in landing combat personnel on hostile beaches, hauls dredgemen around.

Ordinary dredge cuts are 300 feet wide, flagged along both sides and the center-line, and the Sperry gyrocompass is used in checking the sides and spudding ahead. Fifteen degrees on the gyro equal a 5.6 foot move.

The YM-18's operations are a part of a Construction Battalion's activities of harbor development in the Marianas Islands, and come under the general supervision of Commander F. G. Elliott, CEC, of St. Louis, Missouri. Lieutenant Commander C. E. McKay, a Californian, is the executive officer.

New trade literature

Title: **"Basics of Supervision"**
Subject: Perhaps the most thorough and analytical discussion of the broad problems of supervision are presented in this book by an accident prevention authority who understands supervision. H. W. Heinrich has simply and convincingly taken apart the vastly complex subject of supervision, identified its separate basic factors, and arranged in orderly fashion the chain of elements connecting foremanship with safe and efficient production. The four cardinal essentials (attitudes, abilities, knowledge and action) are acknowledged as the basic tools of supervision and clearly explained.

Chapters deal with the promotion of efficiency, production and safety; how to give orders; how to maintain discipline; reasons and remedies for unsafe practices; how to check worker performance; how to train foremen; how to analyze people, etc. Each chapter is followed by a summary and review questions.

The author's narrative style is persuasive, forceful, convincing, and easy to read throughout the 180 pages.
Where to Get: Alfred M. Best Company, Inc., Best Building, 75 Fulton Street, New York 7, New York. ($3.00)

Title: **"White Reports on Wartime Assignments"**
Subject: Playing an important role in all war theaters, White trucks are pictured in this 16-page book performing its five basic assignments. Actual war photos help illustrate the book.
Where to Get: White Motor Company, Cleveland, Ohio. (Free)

Title: **"Grinding Facts".**
Subject: To acquaint grinding wheel users with the newly announced standard markings for identifying grinding wheels and other bonded abrasives, this 136 page reference book on grinding explains the new symbols, and offers grading recommendations for general, toolroom, diamond wheel, and thread grinding. A description of each common type of grinding, safety rules, and table of speeds is of additional value.
Where to Get: The Carborundum Company, Niagara Falls, N. Y. (Free)

Title: **"The 'Authority' Issue"**
Subject: Brief prepared by Judge Clifford H. Stone, director of the Colorado State Water Conservation Board, in collaboration with other national authorities on land and water subjects, giving information concerning the implications of the proposed legislation to create regional or valley authorities.
Where to Get: National Rivers and Harbors Congress, Washington 25, D. C. ($2.75 per 100)

Title: **"Your First Year of the Housing Boom".**
Subject: A comprehensive, confidential report for housing executives, bringing to light the basic facts on which to plan during the coming transition period. Points up the steps that should be taken by business men who expect to participate in the housing boom. Explains how to cash in on the war veterans market; how to tie in with prefabricators; how to utilize present and future labor resources; how to take advantage of population moves from suburbs to cities and from cities to suburbs; new methods of financing; new materials, plastics, insulations, heating, etc. The final chapter "Blueprint For Action" points the way in taking immediate steps for housing leadership.
Where to Get: The Housing Institute, Inc., Empire State Bldg., New York 1, New York. (Price $5.00)

Title: **"Index of Asphalt Literature"**
Subject: The items appearing in the Quarterly Digests of Current Asphalt Literature from 1942 through 1944 are listed in this index. Subjects mentioned in the two years covered include Aggregates, Airport

HOW A B-G BUCKET LOADER KEEPS YOUR TRUCKS *Rolling*

• Cut down their idle time. Keep trucks moving in rapid rotation with a fast feeding Barber-Greene Bucket Loader.

There is no cheaper way to load bulk materials . . . no better way to hold labor costs down.

No time lost getting into position. With its crawler mounting, you can get over soft spots, maneuver in cramped corners easily.

Cutting action across the full width of the feeding spirals keeps the buckets full. Material is delivered at top capacity from stockpiles, natural deposits, and during light excavating, stripping, or shoulder shaping. You have twelve crowding speeds to cope with any loading condition.

There are a score of other advanced mechanical features in the B-G Bucket Loader that will help you save money on every material handling job. Write for free literature. Barber-Greene Company, Aurora, Illinois.

43-78

Barber B-G Greene
Constant Flow Equipment

Paving, Ballast, Iron Ore Tailings, Levee Banks, and Patching.

Where to Get: The Asphalt Institute, 801 Second Ave., New York 17, N. Y.

Title: **"Friction-Minimizing Bearings"**

Subject: Self-lubricating bearings, easily machined and possessing advantages over impregnated bronze, roller and ball bearings have been tested during war-time and now find civilian applications as explained in this booklet.

Where to Get: Morganite Brush Co., Inc., Long Island City 1, New York. (Free)

Title: **"How to Get the Most Service Out of Your Off-the-road Tires"**

Subject: Considered the most comprehensive manual ever issued on the subject, a new 48-page booklet on off-the-road tires should prove highly valuable to every contractor. Applications and suggestions with photographs and recommendations list the uses of proper tires in every field operation. Construction data; dirt, coal, and rock work; operating conditions; a "don't" section; and maintenance are covered in the beautifully illustrated work.

Where to Get: B. F. Goodrich Company, Akron, Ohio. (Free)

Title: **"Over 50 Years of Leadership"**

Subject: Contributions to the solution of power problems are highlighted in this booklet about track-type tractors, Diesel tractors, and motor graders. The performance of this equipment on a wide range of jobs also is given. Copies are free by asking for Form 8815.

Where to Get: Caterpillar Tractor Co., Peoria, Ill.

Title: **"Fourteenth Biennial Report"**

Subject: California's Public Works director reports to his governor on two years' activities his department completed on June 30, 1944. The 300 page book tells how bridges, construction, maintenance, and equipment was handled during the war years and lists the completed and incompleted projects of the state.

Where to Get: Dept. of Public Works, Public Works Bldg., Sacramento, California.

Title: **"Why the Owner Profits"**

Subject: Importance of tractor balance, in design, operation, and price, to perform efficiently is stressed in this 16-page color booklet graphically illustrated with on-the-job photos.

Where to Get: Caterpillar Tractor Co., Peoria 8, Ill., Form 8903. (Free)

Title: **"Did You Know — Bulletin 466"**

Subject: Information about the unusual machine that pumps concrete is contained in this booklet. Complete facts including specifications, charts, graphs, etc., feature the booklet photographically illustrated throughout.

Where to Get: Chain Belt Company, Milwaukee, Wis. (Free)

Notes from the manufacturers

Caterpillar Tractor Co. of Peoria, Ill., announces the return of Major Thomas R. Clark as district representative with headquarters at Omaha, Nebraska. Major Clark entered the Corps of Engineers as a tractor specialist, was devoted to Army interests in the tractor industry at Chicago, served as Chairman of the Spare Parts Committee for all services and has just received his honorable discharge.

Templeton, Kenly & Co., Chicago, Ill., has been granted the Army-Navy Production Award. Prominent contribution to the war effort has been a special track connector for the speedy mounting, demounting and repair of tank crawler treads.

Buffalo-Springfield Roller Co. of Springfield, Ohio, has discontinued its Philadelphia office and is now represented there by the Service Supply Corporation which also maintains complete facilities for servicing rollers. Also announced was the appointment of the Clyde Everett Equipment Co., of Cambridge, Mass., as distributor in the New England States, and George P. White as its eastern sales manager.

Barber-Greene Company of Aurora, Ill., has appointed Phillippi - Murphy Equipment Company, Minneapolis, Minn., as its exclusive distributor for northeast Minnesota and all of S. Dakota and appointed Miller Equipment Company, Grand Rapids, Mich., as exclusive distributor in the construction field for the lower peninsula of Michigan.

Westinghouse Electric Corporation, East Pittsburgh, Pa., has appointed Andrew H. Heywood manager of its Motor Application Department. Heywood was assistant manager of the department previous to his advancement.

Osgood Company and General Excavator Company of Marion, Ohio, announce the appointment of six new distributors of their construction, excavating and materials handling equipment. In southeast Florida, Allied Equipment has taken over the combined Osgood-General franchise, while Don Graze, Jacksonville, Florida, will handle sales and service in northern Florida. The Texas Railway Equipment Company will serve the Houston, Texas area, and the Vande-Water Company of Walden and Schenectady, New York, will serve Sullivan, Ulster and Orange counties in that state. Gibson-Stewart, Cleveland, will provide Osgood and General sales and service facilities in Ohio. Also announced was the appointment of Jack Rheay to the southeastern sales-managership.

Barber-Greene Company, Aurora, Ill., has expanded its area sales organization by appointment of Area Sales Managers Capt. Earle F. Lamprey for New York and Ralph Dano for the Canadian sales areas.

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OR CAUSE TIME OUT
A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.
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A Time-Saving ACCESSORY
RED ARCH CHAIN
Red Arch incandescent butt-welded dragline chain has twice the strength and wearability of ordinary chain. It will save you extra money because of less shutdown time. You can get any size chain from ⅝" to 2" to fit your bucket.
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